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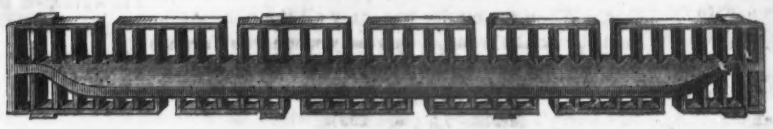
Tupper's Grate Bar.

The Tupper Grate Bar is the result of efforts made to embody in that important part of the furnace the qualities which theory and observation join in demanding as absolutely necessary to the economic use of fuel. The inventor sought to narrow the surfaces of metal exposed to the fire, and also distribute the enlarged air spaces more equally over the grate surface, while at the same time the mechanical advantages of strength and protection against warping, were attended to. He devised a bar, the underside of which is shown in the accompanying figure. It consists of a cast-iron bar about 6 inches broad, and perforated by rectangular openings. From the side of the bar jut small projections, which keep it apart from the other bars and also give it a side bearing at the center of its length. A grate made up of these bars forms a surface covered with a great number of rectangular perforations. The metallic portions are in near contiguity, so that there are no large open spaces through which small coal can fall, and yet the thinness of the parts gives an unusual amount of open space. Strength is ensured by a wide vertical rib on the underside.



TUPPER'S GRATE BAR.

The value of this arrangement has been proved by experience, and the bar has received numerous testimonials of its excellence from industrial societies. It can be used in step grates and indeed in all kinds of fireplaces. For small coal, peat, lignite and all fuels which break up in burning, it has especial advantages. The bar is made by L. B. TUPPER, 120 West street, New York.

The Puget Sound Timber Trade.

It has been generally understood that a considerable lumber trade has grown up within the last few years on our northern Pacific coast, but few have been aware, except those immediately interested, how extensive and far-reaching that commerce has become. The Puget Sound basin in Washington Territory is mostly covered by dense forests of fir or "Oregon pine," invaluable for ship-building and other uses. Much of it can be cut on tide waters, and the rivers emptying into Puget Sound afford numberless water-powers for sawmills. It is estimated that Western Washington has 15,000 square miles of heavily timbered lands, which will yield an average of 30,000 feet of merchantable lumber to the acre. It seems likely that this vast timber preserve is now to be drawn upon to supply the markets of the world.

From official returns it appears that the shipments of fir from the Puget Sound district reached in 1869 the figure of 135,692,512 feet. For the six months ending July 1, 1872, these shipments were 118,856,561 feet, or at the rate of 237,713,122 feet for this year. This shows an increase which will considerably more than double the trade in four years. It is well understood that the business has been much curtailed this year by scarcity of tonnage and high freights. As ship-owners are learning that they can find regular and desirable employment for vessels at Puget Sound ports, it is expected this difficulty will soon disappear. The Sound is a great land-locked harbor, having a shore line of 2,000 miles, ramified by bays, channels, and inlets in every direction, and safe as a mill-pond in every part. The water is very deep and the shore bold, so that ships make fast alongside the mills, and timber is often run from the saw into the hold.

The Custom House records show that during the six months above referred to, vessels have been loaded for almost every accessible part of the civilized world. Callao, Tahiti, London, Mexico, Australia, Russia, New York, China, Valparaiso, Honolulu, Panama, Calcutta, and Victoria being among the names found in the columns denoting destination of cargo. The home consumption is also large, and is rapidly increasing. Kalama, Olaqua and many other new towns are springing up, and Seattle, Olympia, Portland and the older cities are enlarging their boundaries. The building of the railroad from Kalama on the Columbia to Puget Sound has given a new impetus to the development of this whole region. This road is the north and south section of the Northern Pacific Railroad, and will connect the two Pacific coast terminal points of the main line. The Northern Pacific Land Grant in Washington and Oregon includes several million acres of these fir forests, and the opening of the country as the road advances must still further increase the growing timber trade of Washington.

Manufacture of Iron and Steel.

BY EDWARD RILEY, F.C.S.

[Continued from Page 211.]

The question as to whether carbon forms any definite compound with iron is, I think, open to great doubt. Iron seems to have the power of dissolving carbon at a high temperature, and on slow cooling the carbon is separated in distinct graphitic scales. If the cooling is very slow, large crystals ½ to ⅝ of an inch long are formed, and graphite may readily be removed from the faces with a knife. On chilling grey iron, the carbon is retained in a more intimate state of combination or solution, and cannot be separated. As to whether the carbon is chemically combined or whether it is carbon in another form than graphite simply dissolved in the iron, different opinions exist.

Mr. SNELUS, in his paper before alluded to, has clearly shown that the graphite may be separated from grey pig mechanically, either by sifting out the finer portions from pig borings, or floating off the lighter portions by water, and collecting them. By these methods he has found as much as 9·11 and 28·48 per cent. of carbon in the finer parts of Bessemer pig, and 7·015 and 41·392 in the finer portions of Middlesborough pig.

Silicon.—Silicon is an element that is always present in every form of iron, although at times its quantity is very minute, and in wrought iron it is possible the silicon may be due to the cinder between the layers or fibres of the iron.

With regard to silicon, I think we have much to learn as to the different conditions in which it exists in pig iron and steel. We know that carbon exists in three different forms, and that silicon has also the amorphous, the graphitic, and crystalline forms of carbon. It appears to me to be a fair inference that silicon does exist in, at any rate, two different forms in pig iron and steel, and that we may eventually be able to explain many points in the manufacture of iron and steel when we are able to determine the different conditions in which the silicon exists.

I have stated that in the manufacture of Bessemer pig, all the conditions exist for making a highly siliceous pig when siliceous iron ores are used; except perhaps if the object were to alloy silicon with the iron, less flux would be added. Such pigs, the analyses of which I have given, can only be used for the Bessemer process with great loss of yield, as all the silicon has to be oxidised and converted into silicate of iron, assuming the formula of the cinder to be $_3FeO.SiO_3$. Then every per cent. of silicon will require about 4 per cent. of iron to flux it away. Bessemer-converter cinder possibly contains more silica than any other cinder.

As to the conditions in which silicon exists in cast iron, there are different opinions. Mr. SNELUS, in his paper on carbon and silicon in iron and steel before alluded to, is of opinion that it all exists in combination with the iron; Mr. BELL differs from this view, and quotes some instances where silica separates from pig iron.

I quite agree with Mr. BELL, as I have frequently found that silica does separate from cast-iron. On the bearings of rolls I have found a thin skin that readily peels off, consisting of a mixture of perfectly white silica intermixed with small crystals of cast-iron. This usually occurs in faulty rolls; the rolls are cast on end, one bearing up, the other down; on the upper bearing near the dead head, I have found this skin peel off.

I have also found, on examining hematite pigs, that the silicon often separates in very different forms under the same conditions, sometimes very bulky, at other times very dense, so that I have frequently thought there was a small percentage in the pig iron when it has been very high on account of the dense form of the silica.

Some of the silica is readily dissolved in dilute acid, whilst a portion remains in a hard gritty form, undissolved. It was my intention to have carried out a series of experiments on some of the pigs of which I have given an analysis; I regret to say, that on account of a recent illness, I have been unable to

do so. Siliceous pig is frequently made accidentally at ironworks, and is known as glazed or blazed pig. When a furnace is newly blown, this occurs; it is probably due to the excess of fuel that is used in blowing in a furnace.

When any poor materials are used in a blast furnace, a siliceous pig is the result; thus some very poor black-band ironstone, smelted at Dowlais, containing only about 10 per cent. of iron, made a siliceous pig containing 7¼ per cent. of silicon; a sample of Scotch pig has been found to contain as much as 8 per cent. of silicon. I have also known the small rubbish from mine kilns, when it has accumulated and been used in a blast furnace, to make siliceous pig.

There is an impression amongst chemists that silica, when it exists as soluble silica, has a tendency to make siliceous iron. One would suppose, arguing wholly on chemical grounds, that finery or forge cinder would make such iron; practically, however, it is just the reverse; pig-iron smelted wholly from cinders, and known as *kentledge*, contains only from two to three-tenths per cent. of silicon; the only conditions under which cinders make siliceous iron are, when they have been roasted and made infusible.

I have recently made some experiments to determine the largest amount of silicon I can alloy with iron by heating oxide of iron, clean quartzy sand, and an excess of carbon together. The following mixture was used; the red ore was soft red hematite, containing 65.4 per cent. of metallic iron:—

Red ore,	6½ lbs.	
Sand,	6½ "	
Wood charcoal,	2 "	13½ ozs.

The above mixture was heated in a Siemen's furnace, melting tyre-steel, for forty-eight hours in a black-lead steel pot.* On the top was sprinkled a layer of charcoal. The mass had fallen to about one-third of the height of the pot, the powdered charcoal remaining on the top. On breaking the pot, a large, irregular-shaped fused mass was found at the bottom, weighing 3 lbs. 7 ozs. The sand still retained its granular form, although it was semi-fused, with occasional patches of fused vitreous cinder with a purplish tinge, and quite transparent.

Buttons of iron were interspersed through the mass, in some places in the midst of charcoal, in others, finely imbedded in the semi-fused sand without charcoal. Some of the buttons were silvery white, graphitic on the exterior, and very brittle; others imbedded in the sand without charcoal were quite malleable, flattening considerably before breaking on the exterior. These buttons had a yellowish and some a reddish tinge, the fracture was decidedly steely and fine in the grain.

The large lump of siliceous iron contained	17·96	per cent	of silicon.
The brittle small buttons	21·71	"	"
The malleable buttons	3·72	"	"

The alloy is quite insoluble in hydrochloric acid, and only slightly soluble in aqua regia, after boiling for some time. The silicon was determined by fusing the finely-pulverised alloy in a gold crucible with a mixture of carbonate of soda and nitre.

An experiment was also made with cinder prepared by heating some of the same ore with sufficient charcoal and sand to make a fluid silicate of iron. After fusing the silicate it was run out, intimately pulverized, and simply mixed with an excess of charcoal and put into a steel pot in the same Siemen's furnace for forty-eight hours. On taking out the pot, a large button of irregular shape was found at the bottom, weighing rather over four pounds. The silica from the silicate was perfectly fused, and was quite free from iron, with a darkish shade, and similar in appearance to obsidian. The alloy on analysis was found to contain 18 per cent. of silicon.

From the nature of the experiment, from the intense heat the materials were submitted to, and the excess of carbon and silica present, one may fairly assume that 22 per cent. is the maximum amount of silicon that can be alloyed with iron by simply heating silica, charcoal and oxide of iron together.

A silicide of iron of the formula 3FeSi would require 20 per cent. of silicon; the alloy will probably contain some two per cent. of carbon, so that I think it a fair assumption to consider the bulk of the alloy to represent silica in which the oxygen is replaced by iron.

The highest percentage of silicon found in any product from an iron works was found by Dr. Percy in an old bear (hearth of a blast furnace after blowing out) from Tow Law; this iron contained 15·3 per cent. of silicon.

There appears to me to be no difficulty in making siliceous iron in a blast furnace, containing 10 to 12 or even a higher percentage of silicon. Possibly the fact of its being unattacked by acids may make such an alloy available for some purposes, as it will keep bright when exposed to an atmosphere impregnated with acid fumes. The alloy is exceedingly brittle, and may be easily broken by a tap with a hammer.

Quartz, when it exists as such in the ore, more especially the dense hematites of Lancashire, Cornwall and Devonshire, always makes a much more siliceous pig than porous light ores even though the latter contain some amount of amorphous silica; this may be accounted for by the fact that light porous ores are much more readily smelted than dense compact ores—compact ores, such as magnetic oxide of iron and micaceous ores, similar to that from Elba, are not easily smelted on account of their dense and close structure. Such ores, in fact, I may say all ores, are improved by being calcined; it seems to open the pores of the ore, to make it more readily permeable by the gases of the furnace, and more easily fused. In roasting ores, however, care should be taken not to fuse them, or even partially fuse them, as I consider many ores when fused are really of no more value than finery forge or flue cinder.

Phosphorus.—Practically speaking, all the phosphorus in the ore and in the fuel used, passes into the pig iron made. The series of analyses I made of blast-furnace cinder from all the furnaces, 17 in number, at Dowlais, some years since, clearly proved this. When the cinder was grey all the phosphorus passed into the iron; it was only when the furnace was running on a scouring-cinder or cinder containing iron, that the phosphorus passed into the slag (see Percy's *Metallurgy*, page 499).

When furnaces work with the same materials, and the cinder is grey, I have found that the percentage of phosphorus is practically a constant quantity.

This will be seen on referring to the analyses of the South Wales pig, Bowling pig and Seend pig. I should have thought this would have held good with the Cleveland pig, although the analyses of Mr. Bell do not seem to show that it is so. Phosphorus, like silicon, unquestionably makes pig iron weak, although I am inclined to think that when the amount is not more than ½ to ¾ per cent., the strength of pig iron is not affected by it. I have found occasionally best Yorkshire cold-blast pig to contain as much as nearly 1¾ per cent of phosphorus. It contained:

Silicon,	·94
Phosphorus,	1·67

This pig was very tender, although when used in making best Yorkshire iron, it did not materially affect the quality of the bars. Its production was due to the use of a thin seam of clay-band ironstone containing 3·27 per cent. of phosphoric acid.

Manganese.—All grey manganiferous pig that has been made in this country I have found to be very siliceous; this is due chiefly to the ores used containing much quartz. The pig made from the spathose ores at Tow Law is of this character; it is a hard iron, and chills easily; it is used largely for making plow shares; they are cast in a mould, one side of which is formed by cast iron, the other by sand. Although the thickness of the casting is not more than ¼ to ⅜ inch thick, it is on one side quite white to the centre, on the other perfectly grey, the grey iron giving strength to the brittle, chilled, and hard-cutting exterior of the share.

The effect of manganese in making a peculiar pig, called Spiegeleisen, is well known. Formerly this pig was all made on the Continent; it is now being largely manufactured by the Ebbw Vale Iron Company, from the spathose ore of the Brenden Hills. I shall consider the effect of manganese on iron when treating of steel.

With regard to other elements that are occasionally found in pig iron, I find traces of copper and a little titanium in all grey pigs. Cobalt and nickel I find in pig made from the clay ironstones of the coal measures, and in Cleveland pig, also titanium and vanadium in the latter. Vanadium I find in the oolitic ores from Wiltshire in very appreciable quantity (see my paper on "Vanadium in pig iron." *Quarterly Journal of Chemical Society* for 1864). I have also found it in Lincolnshire pig, and my impression is that it will exist in most pig made from oolitic ores; arsenic exists in some hematite pig.*

The above elements I believe to be merely accidental impurities reduced from the iron ore, and that they have no bearing whatever on its quality, unless they are present in unusual quantity.

Much virtue has been ascribed to titanium, more especially by Mr. Mushet, who has numerous patents for its use and application. I must say, however, that after an experience of 12 years, I have failed to be convinced that there is any virtue in it whatever.

Titanium does enter into the composition of most grey pig irons, or, I should say, may be found in most of them. In white pig iron, in wrought iron, and steel, I have always failed to detect it, even when titanic ores have been used wholly for making the pig. If titanium is alloyed with iron, it ought to be found in steel and white iron. My impression is that it exists disseminated through the pig in some form similar to the nitrocyanide, although I have never been able to detect the red crystals in the silica or graphite from pig containing titanium.

In some cases when titaniferous ores are used to the extent of about 5 per cent. with hematite ores, the pig made appears to be stronger; the evidence, however, on this point is open to question.

The use of ores containing titanium in the blast furnace has the effect of giving a blacker and darker color to the iron made.

Hematite pig is undoubtedly improved by using an admixture of aluminous ores, such as the Antrim or Belfast ores, which contain titanic acid. The effect of the titanium is to give the pig a darker color, and commercially this is advantageous, although I think the benefit of the use of these ores is due to the excess of alumina the ores contain.

Titanic ores have been smelted at Norton, for the last four or five years, and unquestionably a very good pig iron is made, more like refined metal in its character than white pig. This is due to the very small percentage of silicon present in the iron; the ore used is quite free from quartz, or any free silica, the gangue being labradorite.

(TO BE CONTINUED.)

INSECT LIFE IN A COAL PIT.—Of late, the miners employed at Muiredge Coal Pit, a little to the north of Buckhaven, and on the Wemyss estate, have felt considerable annoyance in consequence of large-winged insects fluttering around the flames of their lamps and often extinguishing them. A miner, named William Semble, had his attention directed to several gimlet-like holes in the wooden props that support the workings, and, on closely examining the same, discovered live moth-like insects in the cavities. They are evidently foreigners. The wood of which the props were made came from abroad, and they have been in the pit for between three and four years. The insects are, in many cases, just emerging from their birth places into active life underground, and resemble wasps, but are not altogether like those in this country. *English paper.*

*Since writing the above, I have found it in three samples of pig smelted from Northampton ore.

SANTO DOMINGO AND ITS RESOURCES.

By WILLIAM M. GABB, GEOLOGIST.

CONTINUED FROM PAGE 244.

Santo Domingo is so often described as a mass of mountains, that a consideration of her relative proportion of mountain, hilly and level land may be of interest. On studying the map, especially with an inexperienced eye, it will seem that a much larger part of the land is mountainous than really results, if the study is given to the surface itself. This comes from the difficulty of depicting on paper the difference between lower and higher hills. From a careful consideration of the subject, based on his recollection of all parts of the Republic, on his notes and on his map, the writer believes that the following figures will carry a very correct idea of the real proportion of mountain, hilly and level land in the Republic of Santo Domingo. He estimates, 1st, about 40 per cent. of the entire area of the country as being strictly within the definition of "mountain land;" that is to say, land far back in the higher regions, too high, too steep, or too remote for profitable cultivation in a sparsely settled country, where land is very cheap and easily procurable. This, however, includes all the little valleys, which occur throughout the mountain ranges, whether occupied or not; and some of them can be counted among the richest and most productive spots on the island. 2d, about another 40 per cent. of lower ridges, hills and rolling ground, easily accessible and inhabited, at least in part; but all habitable, and available for immediate occupation: and 3d, finally, the remaining 20 per cent. is level land, lying in the valley of the Cibao and bordering all of the coasts; more especially occupying, on the south side, the eastern half of the Province of Santo Domingo, and the whole southern portion of the Province of Seybo.

Almost without exception, the mountains and higher hills are clothed with forests and again, a good part of the level lands, especially of those bordering the coast, support a wood growth, among which are found, according to locality and soil, the logwood, mahogany, fustic, lignum-vitae and satin-wood tree, besides a hundred others, valuable for dye or cabinet purposes, but little known, or entirely ignored by commerce. Portions of the valley of the Cibao, large tracts bordering Samaná Bay, and a large proportion of the level lands of the Provinces of Seybo and Santo Domingo, are nearly without trees, and clothed instead, with grass, suitable for stock-raising. Again, in the region now overrun by disorganized bands of marauders, adjoining the Haytien frontier, and usually known as the valley of San Juan, there is a broad expanse, described as a continuous prairie, clothed with a sea of nutritious grasses, and almost without a tree.

Having described the general appearance and physical peculiarities of the country, the next thing that remains is to consider its resources. These can be comprised under the following general heads. 1st, mines; 2d, agriculture; 3d, grazing; 4th, wood-cutting; 5th, fisheries, etc.

The mineral resources of the Dominican Republic are certainly not of a first-class order. A little gold is found, and, despite the old stories that the yield was 20,000,000 to 30,000,000 dollars per annum, in the times of the early Spaniards, it is a little difficult for us to believe that even a small fraction of such a sum could be obtained now, with all the appliances of modern mining. It is true that there are many spots on the Jaina and Nigua rivers on the south side, and on the Verde, Yaqui, Bao, Amina, Mao, and other less noted rivers in the Cibao, where gold not only has been, but is now found; but the quantity has never been an approach to the most cautiously told stories of the olden time. Nor have the labors of the Geological Survey resulted in the discovery of probable sites of the rich mines from which such sums could have been obtained. In the gold region, every stream yields its share of "grain" or "scale" gold to the patient washer, but no rich placers have been found, and the best spots are those where, on the bank of some stream, the ancient Indians dug pits, and, carrying the dirt in basket or bag to the edge of the water, patiently washed out in wooden bowls, an eighth or a quarter of an ounce a day. For "quartz mining" the prospect may be more promising. Numerous districts exist, mostly at the heads of the streams already named, where quartz veins traverse the rock, and not only do we know that these are the source from which is derived all of the river gold, but independently of that, they present to the eye of the experienced miner, every indication of being rich in gold. The veins are, so far as they have been examined, of good size, well defined and very uniform in appearance. In a word, the prospects of successful quartz mining seem much more favorable than those of the placers.

Copper has been found in numerous localities as, on the north side, near Armasigo, near the head of the Bao, and near Cotui, and on the south side on the Nigua river, near the Jaina at Cobre, and at Recol on the upper part of the Bani river. Not to go too much into detail, the writer does not hesitate in pronouncing a decided opinion, based on a personal examination of most of the localities, that the copper interests of Santo Domingo are worthless—unless he may presume to exercise the caution of reserving decision in regard to a single mine on the Nigua. This—the Monte Mateo mine—is a shallow excavation on a large outcrop, long since abandoned and fallen into ruin. The surface indications are decidedly good, and it is possible that better results might have been attained, had there been a little more skill and patience exercised, and less ignorance and mismanagement shown by the persons who owned and controlled it.

No attempts have ever been made to mine for iron in the Republic. But in the Province of Vega, on the Maimon river, there exists a deposit which must one day surpass in value all the gold and copper on the Island. There is a region here, of several miles in extent, over which occur outcrops of magnetic iron ore, in character and appearance resembling the famous deposits of Missouri and Lake Superior. In the present undeveloped state of the country, they are valueless; but they are located on a stream which could be readily rendered navigable for steamers, as it is now for canoes and rafts, thereby bringing the spot into direct communication with Samaná. The deposits are so situated that they can be quarried in the open air, without any expensive appliances of machinery, and almost without skilled labor. There is a broad belt of limestone accompanying the iron, so that the flux is at hand for smelting; and illimitable tropical forests, abounding in hard wood, surround the spot, furnishing fuel in superabundance.

The salt mines of Neyba will one day furnish a large export of rock salt, as clear as crystal. They are about twenty miles from the port of Barahona, and it is proposed to connect them with the coast by means of a railroad. Besides these mines, the salt ponds of Calderas bay, and salt springs in the interior, as at Honduras, will increase the aggregate, and can make of Santo Domingo by far the greatest salt exporting island of the West Indies.

A little petroleum is found at a place called "El Agua hediondo," or stinking water, near Azua, and some years ago efforts were made to bore an artesian well; but the spring is in a coarse gravel, and the yield is so insignificant that the attempt was, very properly, abandoned. It resembles, both in the character of the spring and of the oil itself, some of the localities of Santa Barbara and Los Angeles Counties in California.

So much has been said about the coal of Samaná and elsewhere in Santo Domingo, that it is necessary to give it at least a passing notice. There are veins of a brown coal, of very inferior quality, found almost everywhere on the island, where rocks of tertiary age occur. But these veins are never of more than a few inches in thickness, the coal is earthy, and not even valuable for the extraction of gas or coal oil. Even if it were of a *moderately* good quality, it would be worthless in a country where fuel is superabundant, and where it is only required for culinary purposes. To be of any commercial or economic value, it would require to be of a quality remarkably well adapted for sea going steam vessels. Then, and only then, would it acquire a value.

Besides the above, silver, bismuth, antimony, lead, mercury, and almost all the other metals have been reported as being found here; and persons are not wanting who have even declared that they themselves have been the discoverers, or have taken out the metal with their own hands. The geological survey just concluded, has demonstrated beyond controversy that these statements are entirely without foundation.

While the mining resources of the country are, as above described, of only moderate importance, it is difficult to say too much in praise of its agricultural possibilities. A soil naturally rich, practically virgin, watered by the never failing rains of the trade winds, and under a tropical sun, where the only change is from spring to summer, and from summer to spring again, cannot fail to produce abundant crops. As will be described further on, the eastern end of the island is more rainy than the western, and the consequent difference in climate produces a marked difference in the vegetation. But all that can be done at Samaná or Seybo, without trouble, can be equally well accomplished at Guyayubin or Azua with the aid of irrigation; and the latter places afford additional advantages in the greater variety of the available crops, to counterbalance the additional cost and labor.

The crops which are most generally cultivated for export are sugar, coffee and tobacco. The latter yields the greatest amount of revenue, because it is specially adapted to cultivation on a small scale, and many a crop reaches the merchants, which will not exceed five or six hundred pounds in the aggregate. The annual yield of tobacco will average about 100,000 ceroons of 100 pounds each. The quality produced is inferior, more on account of want of care in curing, than because the tobacco is of a bad class. Cuban tobacco raisers declare that, while there are fewer varieties cultivated on their island than here, the tobacco of Santo Domingo, properly prepared, could be made to rival their average qualities; and further, that there are districts here, as in Cuba, where the finest qualities could be cultivated successfully. The region which produces most tobacco is the valley of the Cibao. Here, just the proper proportions of wet and dry weather occur to cause the plant to flourish and produce a good class of leaf. It is cultivated everywhere, but where the rains are most abundant, as at Samaná, and on the south side as far west as Santo Domingo city, the plant grows so rank, and with such coarse ribs in the leaves, that its quality is inferior to that of the drier country. It is nevertheless cultivated to no small extent on the peninsula of Samaná, and this industry is rapidly increasing there.

Coffee is raised over the whole island. Hayti produces it in large quantities, and nearly every house in Santo Domingo has its little patch of coffee trees for domestic supply. It is cultivated on a larger scale in the vicinity of Moca than elsewhere, and from there there are exported annually, perhaps 5000 to 6000 quintals. But this is not even an earnest of what could be done, nor yet a relic of what was once done. At one time, Santo Domingo is said to have furnished almost all of the coffee consumed in Europe. The hills are almost everywhere adapted to its cultivation; and all persons who are familiar with the "coffee mountains" of Cuba, agree in saying that the hill region of Santo Domingo, not only resembles that of its sister island, but that it is equally well adapted to the raising of the berry. The cultivation of coffee is specially suitable to persons of small capital. The ground need not be entirely cleared of forest; enough trees of the original growth left for shade, accomplish the double purpose of economy in clearing, and furnish the necessary protection to the tender plants. The trees, once planted, either with forest or artificial shade, and kept clear of weeds, all else that is necessary is patience. In three years, the bushes

give their first crop, small of course; but the next year a full crop can be gathered, and from then, the proprietor has an assured income for life, with only the labor of keeping down the fast diminishing crop of weeds and, in the proper season, collecting the berry and drying it for market. No expensive machinery is necessary, and, after the plants are once set out, the Dominican farmer uses no more complicated tools than the simple "machete" or long wood-knife, for chopping down the weeds once a year.

Sugar manufacturing is a more expensive operation at the beginning, but yields a quicker and a larger profit to the planter. No part of the island, except the highest hill, can be said to be badly adapted to the raising of cane. It grows alike in the moist region of the East, and the dry portions of the West. The writer has seen it successfully cultivated on the arid plains of Lower California by means of irrigation; and in the neighborhood of Azua, where rain sometimes fails for an entire year, are the richest cane fields of the Republic; while in Samaná, where there is never a month without rains, cane flourishes. The only difference is, that in a wet district, the cane produces a more abundant and weeker sap, while in a dry region, the sap, though less in quantity, is richer in saccharine properties, requiring less boiling to concentrate it. The sugar-cane of Santo Domingo requires almost no care in its cultivation, and the longevity of the plant here, as compared with elsewhere, is remarkable. It is not an unusual story to hear of cane fields half a century old, cut annually and never replanted. A stalk now in the Agricultural Bureau at Washington, taken there by the Commission of 1871, measured four inches in diameter when fresh; and President Baez has assured the writer, that he has seen a stalk weighed, which turned the scale at 52 pounds; and that when he counted 27 stalks growing from a single root, the laborers offered to show him other bunches with from 40 to 50 stalks ready for the mill.

It is counted the rule, that the first year's yield of sugar pays all the expenses of clearing and fencing the ground, of planting and of making the sugar. After that, of course, the profits are proportionally greater, the original capital being all refunded.

Another crop, very suitable for a permanent investment, is Cacao, the nut from which chocolate is made. The cacao tree requires but little care in planting, except to be set out at proper distances, and while young, to be shaded from the sun. At seven or eight years it begins to yield and never fails during the lifetime of the planter. The preparation of the nut is very simple, consisting only in drying it, with the precaution of not allowing it to become mouldy. It is then ready for the market. The objection to this industry is the length of time before the investment yields a return; although when it does begin, it is a safe and profitable one.

Cotton is nowhere cultivated on a large scale. The greatest extent is that of a few plants aside of almost every house, which furnish the household with the thread for the domestic sewing. These plants are perennial trees, from 6 to 15 feet high, never out of bearing. They always show the bud, the flower, and the snowy boll, and yield an average of about 200 bolls annually. The writer has experimented to a small extent with American cotton, having planted some seeds for the Agricultural Bureau of Washington, marked "Georgia Upland." It produced broad, spreading plants, about three feet high, which yielded continuously for an entire year with no prospect of failure, until he caused them to be destroyed, being completely satisfied with the favorable results of the experiment. The climate is admirably suited for cotton, and it can be cultivated as cheaply in Santo Domingo as in the United States. The cocoa-nut tree flourishes anywhere, but more especially on the barren sea beaches, where nothing else will grow. It requires no care, and it is said that a bearing tree, that is, one over six or seven years old, will yield to its owner a regular revenue of two dollars per annum. They yield without ceasing, and outlive the longest human life.

The demand for the nuts is practically unlimited, and the husk has become an article of commerce for the making of matting. It is only necessary to mention bananas, oranges, lemons, limes and pine apples; and there are many other fruits growing about spontaneously in St. Domingo, which can be carried to a northern market as easily as bananas, and which would there meet a ready sale.

The government of Jamaica has, within a few years past, introduced the cultivation of the cinchona tree, which has there proved an eminent success. There is a region in the Republic of Santo Domingo, nearly as large as the State of New Jersey, where this plant can be cultivated as easily as in Jamaica, were there persons willing to undertake it.

For local use, corn, rice, potatoes, both white and sweet, but more especially the latter, beans, pumpkins, squashes, melons, plantains, bananas, cabbage, cassava, yams, okra (or gumbo), egg plants and numerous other plants, less known in the United States, are cultivated habitually; and beats, radishes, turnips and carrots have been raised by the writer, with perfect success. Three crops of corn are frequently raised on the same ground in one year, and, if it is proposed to cut it green for fodder, one, or even two, more can be obtained. The writer has himself caused corn to be planted every month of the last two years, and up to the present time (March, 1872,) has never lost a single planting.

Grazing, and the raising of horses, neat cattle, goats, and even sheep, can also be included among the profitable industries of the Island. The broad plains of the eastern part of the Province of Santo Domingo and the adjacent portions of the Province of Seybo, offer grazing ground for a thousand fold more animals than now occupy them. The grass is perennial; famines never starve, floods never drown, winters never freeze and droughts never famish the animals. There are no wolves to kill colts or calves, and the only care the owner knows, is to herd his animals occasionally to prevent their straying too far, and to bring together, and brand them once a year. The western part of the Republic, about San Juan, is said to be more fertile, and better adapted for grazing purposes than the east; but the border troubles have driven out the population, and left this beautiful region a prey to roving bands of outlaws who, under the name of rebellion, plunder alike friend and foe, whoever may fall into their hands. A colony of a hundred American families, such as settle on our own frontier, would forever put an end to this brigandage, and restore to usefulness a region, formerly one of the richest and most productive on the Island. Again, nearly the whole length of the Cibao abounds in broad tracts of pasture land, and here are produced the best horses of the country. The few sheep that are raised, seem to flourish, and goats and cattle roam everywhere.

The forests of Santo Domingo produce large quantities of dye and cabinet woods. Mahogany is found wherever there is a calcareous soil, logwood grows almost everywhere, lignum-vitæ abounds in the forests of the drier portions, and fustic and satin wood are abundant. These woods are, of course, cut off pretty thoroughly wherever the facilities of transportation give easy access to a market; but there are enormous tracts in the interior, awaiting roads to revive one of the greatest sources of wealth in the country. Nor are the above well-known woods, the only valuable ones produced by the forests. Many others, entirely unknown abroad, useful for the building of houses or ships, for cabinet work, and for a great variety of other purposes, are found everywhere.

Extensive forests of pine, resembling our yellow, or pitch pine, clothe much of the mountains; and all of the southern tributaries of the Yaqui, and most of those of the Yuna run through large tracts of these trees, which await only the axe and saw-mill to supply nearly all the plank used in the Republic.

White pine boards, imported from New York and Boston sell now at $50 per thousand in Santo Domingo City, and grooved and tongued yellow pine flooring, if only second quality, is worth $60; while in the interior, it is replaced by hand-sawed native wood which is sold at $1 per plank, big and little together, or say about $80 to $100 per m. A little energy and a comparatively small capital, judiciously invested in this business, cannot fail to bring large profits.

[TO BE CONTINUED.]

A Glacial Moraine in New Jersey Adopted as a Railroad Embankment.

We have just passed over the Midland Railway, and wish to draw the attention of Civil Engineers and Geologists to a very curious feature of that line at Ogdensburgh, 56 miles from New York.

Leaving the Pennsylvania Railroad Company's depot in Jersey City, the Midland train runs toward Newark for a mile or so, through the deep cut in the trap range back of the city, and then switches off to the right and runs north along the east edge of the great marshes through which the Hackensack and Passaic rivers meander. Formerly, New York Bay occupied all this district, which is in fact nothing else than the common delta of these streams. Side by side with the New York and Erie Railroad the Midland runs northward for some miles and then sweeps round northwestward and westward through Hackensack to Paterson (20 miles from New York), where it turns sharp north again, crosses the Passaic, and begins its ascent of the east side of the Paterson trap range. It is 230 feet above tide at Wortendyke station (26 miles), 340 at Wyckoff (27), and 380 at the summit, where it turns west and southwest, and runs down to 270 feet at Oakland, 230 feet at the bridge over the Ramapo river, and 210 at Pompton.

Here the line commences its ascent of the valley of a branch of the Ramapo, cutting square across through an extensive primary country of gneiss rocks, which form the front range of the Highlands. Its general course is pretty straight, one or two points of the compass north of west, until it reaches the summit of a high pass in the Walkill Mountain. The heights of its different stations, observed by barometer, are as follows: Bloomingdale 250 feet (36 miles), Smithsville 440, Charlotteburg (43) 710, Newfoundland (44) 760, Oakhill 800, Snufftown 990, which is nearly at the summit. The line then descends west, the west side of the Walkill mountain to Ogdensburgh (56 miles from New York), where it is 630 feet above tide. Here it finds and uses the natural dam or embankment across the level bottom of the Walkill Valley, to which we invite attention.

The valley is straight for many miles south of Franklin; runs nearly north and south; drains northward: and consists of white and blue limestone outcrops cultivated from an early day. The rocks dip steeply either N. 75° W., or S. 75° E. The west side of the valley is made by a range of crystalline white limestone hills, 200 to 300 feet high, in which lie the famous Franklinite iron and zinc ore beds of Stirling Hill and Franklin, backed by a country of gneiss rock. All the outcropping rocks of the valleys and hills are *rounded and polished, grooved and scratched by ice*, just as they are in the Alps. Sand, gravel and boulders tell the same story of a glacier moving up the valley from the north southwards.

The natural embankment across the Valley at Ogdensburgh is apparently the terminal moraine which this glacier left when it had shrunk to a smaller size, and was about disappearing from the country at the end of the Glacial era. It consists of sand, gravel and boulders from the top to bottom; is about a mile long, abutting against the Walkill Mountain on the east and against Stirling Hill on the west; is 100 feet high, and not more than 250 feet wide at the base; consequently resembles a railway embankment. The Walkill has cut through it at its west end, and the Midland has filled up the cut with an artificial embankment borrowed from the stuff of the natural embankment, leaving open two culvert ways, one for the country road and the other for the Walkill waters. —*U. S. Railroad and Mining Gazette.*

THE COAL TRADE.

NEW YORK, Oct. 17th, 1872.

Business has been very good for all sizes, while stove and chestnut have been in great demand. Of stove coal there are no stocks on hand, and the call is greater than the supply. Prices are of course maintained, and as we said, last week, there is talk of a further advance. The subject is still in abeyance and nothing definite is known, but the movements of the Reading magnates will be looked for with interest. November promises to be even busier than October, and the trade looks forward to recovering during the coming season the losses of the summer. We have noticed in some papers, hints that the middle-men in coal might have to fight a battle for their position with the coal producers, who are said to meditate a division of the middle-men's profits with their customers, or more probably a seizure of them altogether. It is in the first place doubtful in the last degree if such a move has been seriously meditated, and it is still more doubtful if it could, under any circumstances, succeed. Retailers have the privilege now of choosing between producers and dealers, and if they support so many middle-men it is because they find their advantage in doing so. We know from personal experience that they support the dealers because they find the dealers convenient. It may seem absurd to undertake the defence of a class of men who are not peculiar to the coal trade, but form an integral part of every business conducted by man and whose value is proved by the very fact of their existence. But since rumors of an attack upon them have found voice, we devote these few words to the subject.

A further rise of ten cents a ton has taken place in Cumberland coal, making the total advance this month twenty five cents. Business is active.

Anthracite Coal Trade for 1871 and 1872.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending October 12, 1872, compared with the week ending Oct. 14, 1871.

COMPANIES.	1871. WEEK.	1871. TOTAL.	1872. WEEK.	1872. TOTAL.
*Phila & Reading R. R†	148,043	4 352,617	131,687	4,547,459
Schuylkill Canal	33,435	808,191	20,737	674,837
*Lehigh Valley R. R.	72,147	1,75?,105	55,165	2,612,516
Lehigh & Sus. R. R.	30,241	952,032	23 092	1,358,226
Lehigh Canal	29,804	543,721	24,562	626,215
Scranton North	20,245	397,593	23,160	600 218
" South	39,194	865,745	35,910	1,657,202
Penn. Coal Co., rail	24,9?1	53?,725	27.360	944,017
" " " canal	479	10,913	239	5,034
Del. & Hud. Canal Co.	29,723	770,352	40,432	1,162,5?6
" East	15,591	246,111	9,481	459,436
" West	3,660	85,895	10,971	318,682
" " South	9,778	239,384	7,9?9	304,911
Shamokin	12,864	505,465	15,053	436,821
Trevorton	....	.....	....	....
Lykens Valley Coal Co.	...	71.965	..	2,085
Wyoming North	....	.....	....	....
Wyoming South	....	.....	....	....
P. N. Y. C. & R. R. Co.	....	104,987	12,746	501,605
Williamstown Col'y	....	...	....	...
Big Lick Col	....	113,791	....	10,591
Total.	465,170	12,358,152	436,534	16,222,761
1870	436,543			12,358,152
Increase				3,864,608
Decrease	28,627			

* These figures are for the week and fiscal period commencing Nov. 30.
†Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1871 and 1872.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Oct. 12, 1872, compared with week ending October 14, 1871.

COMPANIES.	1871. Week.	1871. Year.	1872. Week.	1872. Year.
C. & O. Canal	16,112	553,366	15,115	517,311
B. & O. R. R	23,010	972,?77	24,?14	976,959
H. & B. T. R. R	5,946	252.941	6,414	236,708
*Harrisburg & D	10,507	435,134	9,519	399,148
*L. V. R. R	8,310	315,500	582	23,162
P. & N.Y.C. & R. Co.	....	.....	6,215	296,083
Cumberl'd Branch Canal	5,631	162,956	4,495	174,660
" Railroad	1,199	56,463	939	16,461
Total	70,715	2,748,645	67,893	2,640,492
	67,893	2,640,492	(	
Decrease	2,822	108,153		
Increase				

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, Oct. 12, 1872.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	23,160 07	600,218 06
Shipped South	35,910 02	1,657,201 15
Total	59,070 09	2,257,420 01
For the Corresponding time last Year:		
Shipped North	20,241 19	397,592 17
Shipped South	39,194 10	865,245 07
Total	59,439 09	1,262,838 04
Increase		994,581 17
Decrease	369 00	

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, Oct. 12, 1872.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair	34,335 03
" Port Carbon	4,980 14
" Pottsville	2,663 12
" Schuylkill Haven	29.016 15
" Pine Grove	4,278 03
" Tamaqua	13,970 00
" Harrisburg	4 00
" Dauphin	5,722 08
Total	94,970 15

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	7,477 16
" Mill Creek "	1,826 00
" Schuylkill Valley Scales	160 13
" Mt. Carbon "	867 04
" Cressona "	8,325 03
" Pine Grove "	
" Tamaqua "	2,683 06
Total	21,340 02

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	2,407 17
" Shamokin	5,293 02
" Herndon	.....
Total	7,700 19

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	718 15
" Lebanon & Pine Grove Branch	1,006 13
Total	1,725 08

CONSUMED ON LATERALS.

From Frackville Scales	813 13
" Mill Creek "	453 01
" Schuylkill Valley Scales	594 18
" Mt. Carbon "	723 04
" Cressona "	358 00
" Pine Grove "	125 00
" Tamaqua "	876 03
Total	3,943 19

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	134 17
" " Alburtis, " "	
" " Oreland, G. & N. Br.	1,323 14
" " Connecting R. R.	.....
" " Willow Street R. R.	547 09
Total	2,006 00

BITUMINOUS.

From Harrisburg	9,498 11
" Connecting R. R., G. & N. Br.	
" Junction R. R.	20 00
Total	9,518 11

COAL FOR COMPANY'S USE.

Anthracite	5,735 18
Bituminous	302 19
Total	6,038 17

RECAPITULATION.

	Total for Week.	Corresp'g week last year.	Increase and Decrease.
Passing over Main Line and Leh. Val. Branch	94.970 15	105,474 00	d 10,463 05
For Shipment by Canal	21,340 02	29,772 09	d 8,432 07
Shipped Westward via Northern Central R. R.	7,700 19	4,760 13	i 2,940 06
Shipped West or South from Pine Grove	1,725 08	2,384 15	d 659 07
Consumed on Laterals	3,943 19	3,366 02	i 577 17
Lehigh and Wyoming Coal	2,006 00	2,330 00	d 324 00
Total Anthracite paying freig't	131,687 03	148,047 19	d 16,360 16
Bituminous	9,518 11	10,506 14	d 988 03
Total of all kinds paying freig't	141,205 14	158,554 13	d 17,348 19
Coal for Company's use	6,038 17	4,079 01	i 1,959 13
Total Tonnage for Week	147,244 11	162,633 17	d 15,389 06
Previously this year	5037181 03	4812536 00	i 224,645 03
Total to date	5184425 14	4975169 17	i 209,255 17

SHIPPED BY CANAL.

From Schuylkill Haven	18,413 10	27,342 10	d 8,929 01
" Port Clinton	2,154 00	3,671 00	d 1,517 00
Total Tonnage per Week	20,567 10	31,013 10	d 10,446 00
Previously this year	651,269 05	785,774 07	d 131,505 02
Total to date	674,836 15	816,787 17	d 141,951 02

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending October 12—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1872., tons ct	WEEK 1871, tons ct.	YEAR 1872 tons cwt.	YEAR 1871, tons.cwt.
Wyoming Region	19064 06	30765 03	1165582 15	978861 18
Upper Lehigh Region	3792 02	3888 07	157842 09	69055 12
Hazleton Region	7610 16	10515 08	200558 19	150198 01
Beaver Meadow Region	4384 11	2935 11	125547 12	62102 08
Mauch Chunk Region	8144 15	6359 11	350064 08	162438 01
Trenckow Region				
Mahanoy Region				
Totals	42996 10	54454 00	1999596 03	1462656 00
Increase			536940 03	
Decrease	11457 10			
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	23091 18	30241 09	1358225 16	952032 05
Forwarded East of Mch Chunk by Canal	14576 11	18142 12	472915 02	311839 17
Delivered at and above Mauch Chunk	1431 03	3082 01	47418 16	49374 11
L. V. R. R at Packer'n	156 17	482 14	11333 02	25715 15
Delivered to L. & B. R. R. at Plymouth Bridge	3740 01	2505 04	179703 07	73693 12
Totals				
Of the above there was transported on acc't of L. C. & N. Co	12180 11	10934 13	516737 14	239633 19
W.-B. C. & L. Co	9826 15	16635 11	779227 18	664315 13
Totals	22007 06	27570 04	1295965 12	902949 12
Increase			393016 00	
Decrease	5562 18			

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending Oct. 12, 1872, with totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	10,021 12	443,689 04
" Hazleton	44,632 08	1,398,967 17
" Upper Lehigh	93 13	2.442 07
" Beaver Meadow	15,366 04	660,421 00
" Mahanoy	6,623 16	324,?99 08
" Mauch Chunk	38 13	2,487 07
Total	76,775 16	3,332,407 03
Same time last year	97,001 10	2,182,436 05
Increase		1,149,970 18
Decrease	20,225 14	
Forwarded East from Mauch Chunk by rail	55,164 12	2,612,416 04
Same time last year	72,147 10	1,758,105 04
Increase		854,311 00
Decrease	16,982 18	

DISTRIBUTED AS FOLLOWS.

Forwarded East from Mauch Chunk by rail	54,503 18	2,572,303 02
do East for use L. V. R. R	660 14	40,113 02
Delivered at and above Mauch Chunk for use of L. V. R. R	1.074 12	48,808 09
To P. & N. Y. R. R	7,575 05	310,002 16
To N. C. R. R. at Mount Carmel		2,156 05
To D. H & W. R. R	1,263 13	25,375 14
To L. & S. R. R. at Packerton for rail	249 14	11,030 04
Delivered at M'h Chunk	87 03	1,657 12
Delivered on line of road above Mauch Chunk	355 12	13,590 09
To L. S. & R. R., at Penn Hav., for railroad	7.411 00	4,011 19
Do. for canal	3,594 05	192,837 17
To Lehigh Canal Mauch Chunk		100,724 04
To Catawissa Railroad		9,635 16
Total	76,775 16	3,332,407 03

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Oct. 12 and during the year 1872, compared with the corresponding period of 1871.

WEEK.

	To C. & O. Canal Tons. Cwt.	To B. & O. R. R. Co. Tons. Cwt	Total. Tons Cwt.
1872	15,115 04	24,613 11	39,728 15
1871	16,111 11	23,010 09	39,122 00
Increase		1,603 02	606 15
Decrease	996 07	.....	

YEAR.

1872	517,311 05	976,959 03	1,494,270 08
1871	553,366 06	972,277 04	1,525,643 10
Increase	.....	4,681 19	
Decrease	36,055 01		31,373 02

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co Tons. Cwt.	Total. Tons. Cwt.
1872	4,494 11	938 14	5,433 05
1871	5,630 13	1,199 00	6,829 13
Increase	.....		
Decrease	1,136 02	260 06	1,396 08

YEAR.

1872	174 660 02	16,460 10	191,120 12
1871	162,956 06	56,162 13	219,419 04
Increase	11,703 16		
Decrease		40,002 08	28,298 12

Lehigh Coal and Navigation Company,

Report of Coal transported over the Lehigh Canal and L. & S. Div of Central Railroad of New Jersey for the week ending Oct. 12, 1872, and for the year 1872.

	WEEK.	YEAR.
Forwarded East of M'ch Chunk by Rail	23,091 18	1,358,225 16
Delivered at and above do., ...	1,431 03	47,418 16
Forwarded East of do., by Canal	24,562 03	626,214 14
	49,085 04	2,031,859 06
Corresponding period last year—		
Forwarded East of M. Chunk by Rail	30.241 09	952,032 05
Delivered at and above do., ..	3,082 01	49,374 11
Forwarded East of do., by Canal	29,803 11	543,720 14
	63,127 01	1,545,127 10
Increase on Railroad	.....	404,237 16
Decrease " "	8,600 09	
Increase on Canal	.....	82,474 00
Decrease " "	5,241 08	

Of the above there was transported on account of—

Lehigh Coal Nav. Co	79,058 03	722,244 16
Wilkesbarre Coal & Iron Co	9,826 15	779,227 18
	28,884 18	1,501,472 14
Corresponding period last year—		
Lehigh Coal & Nav. Co	19,717 04	438,787 06
Wilkesbarre Coal & Iron Co	16,635 11	664,315 13
	36,352 15	1,103,102 19
Increase	.....	398,369 15
Decrease	7,467 17	

Lehigh Canal Coal Trade.

Shipped for the week ending October 11, 1872.

	Week. Tons. Cwt.	Week. Tons. Cwt.
Total from Mauch Chunk Region	6,877 12	205,507 02
" " Hazardville "	1,476 00	13,475 02
" " Beaver Meadow "	4,483 05	125,799 14
" " Mahanoy "	666 11	9,197 06
" " Hazleton "	7,411 00	192,371 10
" " Upper Lehigh "	836 16	23,697 13
" " Wyoming "	2,810 19	66,166 07
Total	24,562 03	626,214 14
Corresponding week last year	29,803 11	543,720 14
Increase	.....	82,494 00
Decrease	5,241 0	

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, October 12, 1872.

	WEEK.	SEASON.
North	45,663 17	2,015,789 01
South	7,999 06	304,910 14
Total 1872	53,663 03	2,320,699 15
Corresponding time in 1871:		
North	50,325 06	1,112,898 01
South	9,778 09	239,384 11
Total	60,103 15	1,352,282 12
Increase North		
Decrease North		
Increase South		
Decrease South		
Total increase 1872		968,417 03
Total decrease 1872	6,440 12	

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending Oct. 5, 1872.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	42,070	1,122,073
By Railroad, East	8,575	449,905
" " West	12,477	307,710
" " South	7,326	296,912
Total Tons	70,443	2,176,650

For the same period last year.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	40,728	740,659
By Railroad, East,	8 811	235,520
" " West	4,188	82,244
" " South	10,851	229,606
Total Tons	64,578	1,288,029
Increase	885,621	

The following is a statement of coal transported by the Delaware and Hudson Canal Company, for the week, ending October 12, 1872.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	40,432	1,162,506
By Railroad, East	9,481	459,416
do West	10,971	318,682
do South	7,999	304,911
Total Tons	68,883	2,245,535
For the same time last year:		
By Delaware and Hudson Canal,	29,723	770,382
By Railroad, East	10,591	246 111
do West	3 650	85 895
do South	9,787	239,384
Total Tons	53,742	1,341,772
Increase	903,763	

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending October 12, 1872.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received:		
From Lehigh Valley R. R.	7,575 05	310,002 16
" Lack. & B. R. R.	1 211 17	66 052 06
" Pleasant Valley R. R.	3,000 14	81.929 15
" Sul. & Erie R. R.	957 19	43 620 04
Total	12,745 15	501,605 01
Distributed:		
To Lehigh Valley R. R.	688 07	31,852 16
To Lack. & B. R. R.	10 12	1.034 00
To S. Central R. R	3,410 17	93,775 10
To Ithaca & A. R. R.	1,771 00	78,210 01
To Erie R. W. Pockets for shipm't.	4,192 03	227,748 19
To individuals on line of road	789 17	18,372 07
To points at & above Coxton for use of Co.	529 12	20,281 02
To points between Waverley and Elmira	1,353 07	30,330 06
Total	12,745 15	501,605 01
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	6,215 09	293,786 02
Shipped south from Towanda	.....	2,080 07
Northern Central R. R.	.....	216 10
Total	6,215 09	296,082 19
Distributed:		
To Erie Railway	5,514 12	264,688 15
To So. Central R. R	700 17	28,820 02
To Ithaca Valley R. R.		57 05
Lehigh Valley, R. R.	....	1,201 01
To individuals on line of Railroad.	....	970 12
To points on line of road for use of Company	....	255 04
Total	6,215 09	296,082 19
Grand totals transported:		
Anthracite	12,745 15	501,605 01
Bituminous	6,215 09	296,082 19
Total	18,961 04	797,688 00

Northern Central Railway, Shamokin Division.

Below is the return of Coal sent over the Shamokin Division of the N. C. R. W., for the week ending October 12, 1872.

	Tons. Cwt.
East	1,084 16
West	11,969 03
	13 053 09
Same time last year	12,863 19
Increase	189 10
Decrease	.....
Total amount shipped to date	436 820 17
Same time last year	505,465 10
Increase	.....
Decrease	68,644 13

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, October 12, 1872.

	Tons. Cwt.
From Schuylkill Haven	18,413 10
" Port Clinton	2,324 00
Total for week	20,737 10
Previously this year	654,099 05
	674,836 15
Total	
To same time last year	806,190 17

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending October 12, 1872.

	1872. WEEK.	1872. YEAR.	1871. WEEK.	1871. YEAR.
By Railway	27,300 04	944,017 04	24,970 10	533,724 15
" Canal	238 19	5,034 07	478 10	10,942 16
Total	27,539 03	949,051 11	25,449 00	544,667 11
Increase 1872	404,384 00			

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK. October 18. R. A.	W. A.	AT PHILADELPHIA. October 18. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$— —	— —	
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	
Egg	5 25	4 75	— —	— —
Stove	5 50	5 00	— —	— —
Chestnut	4 25	—	— —	
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	5 35	—	— —	— —
Broken	4 60	— —	— —	— —
Egg	4 60	— —	— —	— —
Stove	4 85	— —	— —	— —
Chestnut	4 35	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.				
Honey Brook, Le'h W.A.	4 00@5 00		— —	— —
Spring Mountain " "	— —@— —		— —	— —
Sugar Creek " "	— —@— —		— —	— —
Sugar Loaf " "	— —@— —		— —	— —
Old Comp'y's " "	4 00@5 15		— —	— —
Room Run " "	4 00@4 50		— —	— —
McNeal " "		— —	— —	— —
Girardville " "		— —	— —	— —
Hill & Harris " "		— —	3 10@4 00	—
Shamokin " "		— —	— —	— —
Lykens Valley " "		— —	— —	— —
Broad Top " "		— —	— —	— —
McMichael " "		— —	3 25@4 25	— —
Henry Clay " "		— —	— —	— —
Powelton "		— —	— —	— —

Company Coals.

October, 1872.

	L.	Str.	Ora.	Egg.	Sto	Chest
*Scranton at E. Port	3 45	3 45	3 65	3 70	4 00	3 50
*Pittston at Newburg	3 80	3 80	3 80	3 80	4 00	3 80
*Lackawana at Weehawken	4 01	4 10	4 10	4 30	4 00	3 60
Wilk'b're at Hoboken	3 60	3 65	3 85	3 85	4 04	4 10
Old Co. Lehigh at Pt John'n	5 25	—	4 50	4 60	4 60	4 00
Lehich at Eliz. Port	5 00	—	4 60	4 60	4 60	4 00

For freights to different points see "Freights."
To contractors only.

Prices at Baltimore—October, 1872.

Wholesale Prices to Trade.

Wilksbarre, by cargo or car load	$5 20@5 35
Pittston and Plymouth, do	4 90@5 15
Shamokin Red or White Ash, do	5 10@5 35
Lykens Valley Red Ash, do	6 00
Zerba Valley	
Freverton	
By retail, all kinds per ton of 2,240 lbs	6 50@8 00
George's Creek and Cumberland f. o. b. at Locust Point for cargoes	@4 75
Fairmont and Clarksburg gas f. o. b. at L. Point	6 00

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Consolidation Coal Co.'s on board N. Y.	
Maryland Coal Co "	

Prices at Georgetown, D.C., and Alexandria, Va.

October, 1872.

George's Creek and Cumberland f. o. b. for shipping $4 25@4 35

Prices at Havre de Grace, Md.

October, 1872.

Wilkesbarre and other White Ash for Cargoes	$ @5 00
Lykens Valley	@6 00
Shamokin Red or White Ash	4 75@5 00

Bituminous Coals (Cumberland).

Georgetown, F.o.b.	$4.25
Baltimore	4.65
New York	6.60

Prices of Gas Coals.

October, 1872.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y

	Coarse.	Slack.
Block House	$1 60	$— 75
Gowrie	1 60	— 75

Vessels are being chartered at $3 00 to $3 25.

Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	1 25
Sydney	2 25	- 80
Lingan	1 60	- 80
Caledonia	1 60	- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm: 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale: 75 cents per ton of 28 bushels.

AMERICAN.

	Currency.
Westmoreland	$7 10 @— —
Fairmount Gas Coal Co. of N. Y.	7 00 @— —
Despard Coal Co	7 00 @— —
Penn	7 10 @— —
Newburg Orrel Gas	— — @— —
West Fairmount Gas Coal	7 00 @— —

AT PHILADELPHIA.

Westmoreland	7 00 @— —

Prices of Foreign Coals.

October, 1872.

Duty 75 c. per ton.

Corrected weekly by ALFRED PARMELE, No. 32 Pine street, N. Y

Liverpool Gas Caking	$ 8 00@— —
" Cannel	12 00@13 00
" House	19 00@20 00
" Orrel	14 00@16 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$14 00@16 0
" Cannel, "	19 00@23 0

Per ton 2.000 lbs. delivered.

Freights.—October, 1872.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore	Anthracite. From Philada's.	Anthracite. From Elis. Port, Port Johnson, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout.
Amesbury		2 75		1 95		
Bangor		2 75				
Bath		2 60		2 10	2 25	2 25
Boston	2 60	2 60		1 10	1 25	1 25
Bridgeport	2 25	2 30		1 45	1 60	1 70
Bristol						
Cohasset Nar'ows				1 25		
Derby				2 10	2 25	2 25
Dighton	2 35			1 45	1 60	1 70
East Cambridge						
Fall River	2 25	2 35				
Hackensack				1 60		
Hartford	2 50	3 00		60		
Hoboken	1 90			60	60	65
Jersey City	1 90					
Lynn				1 40	1 50	1 60
Middletown						
Mystic		2 75		1 70	1 70	1 75
New Bedford	2 35	2 50		2 20	2 40	2 50
Newburyport	2 50	2 75		1 10	1 25	1 25
New Haven	2 25	2 30		1 30	1 40	1 50
New London	2 25	2 30		1 45	1 60	1 70
Newport	2 25	1 90		65	60	65
New York	2 05	1 90		1 10	1 25	1 75
Norwalk	2 50	2 60		1 40	1 50	1 60
Norwich	2 30	2 30		1 55	1 70	1 75
Pawtucket		2 65		1 90		
Portland	2 60	2 50		2 15	2 40	2 45
Portsmouth, N.H	2 70	2 75		1 45	1 60	1 75
Providence	2 30	2 35				
Rockport						
Saco		3 00		1 30		
Sag Harbor				2 10		
Salem	2 60	2 75		1 10	1 25	1 25
Stamford				1 35		
Stonington				1 95		
Taunton				1 45		
Warren						
TO RIVER PORTS						
Albany	3 00	2 40				
Catskill						
Cocksackie						
Coeyman's						
Cold Spring	2 30	2 25				
Fishkill						
Haverstraw	2					
Hudson	2 30	2 30				
New York						
Nyack	2 25					
Poughkeepsie	2 25					
Rhinebeck						
Rondout						
Saugerties						
Sing Sing						
Stuyvesant						
Tarrytown						
Troy	3 00	2 50				
West Point						
Yonkers						

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption ($1 85 less 55c drawback	$1 30
For reshipment	1 75

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 66
C. R. R., N. J., Phillipsburgh to Elizabethport	0 98
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$1 99

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 66
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	0 98
Shipping expenses	25
Wharfage	
Total	$1 99

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	66
Morris & Essex R. R. Phillipsburgh to Hoboken	0 98
Shipping expenses	25
Wharfage	
Total	$1 99

TO SOUTH AMBOY.

L. V. R. R.	66
B. & D. R. R.	98
Cam. & Am R. R.	
Shipping Expenses	37
Total	$ 199

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	0 70
C. RR. of N. J. Phillipsburgh to Elizabethport	0 98
Shipping expenses	25
Wharfage	10
Total	

Foreign and Provincial Freights.

October 1872.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons £
Liverpool, 5 per cent primage

TO NEW YORK.

Provincial.

Sydney	$3 05
Lingan	3 50
Cow Bay	3 75
Port Caledonia	3 10
Little Glace Bay	2 00

TO BOSTON.

Sydney	3 00
Lingan	3 00
Cow Bay	3 00
Port Caledonia	3 00
Little Glace Bay	2 90

MARKET REVIEW.

NEW YORK, Oct. 17, 1872.

IRON—Scotch Pig is quiet, and with light stocks, full prices are asked. Occasionally a lot is sold at less than our quotations, but the principal importers refuse to sell below previous asking rates. We note sales of 50 tons Summerlee at $56; 175 do., $55; 125 do. No. 1 Carnbree, $53; 75 do. Gartsherrie, 150 do. Glengarnock, and 300 do. from ship, a late arrival, and 300 do. to go up river, on terms not made public. A sale of 200 tons Eglinton is reported at $51, which is below our quotations. In American No. 1 brands there is nothing doing except to fill contracts, in which the Lehigh companies are still behindhand; we hear of no sales. New English Rails tend downward; we quote $73a74, gold, though 1000 tons are reported sold at $70, cash. We quote English and French Bessemer Steel, $144a145, gold, and American do., $125a130 currency. We understand that the entire production of the English and American mills have been sold ahead for all 1873 and part of 1874. Old English are quiet at $46 a47 gold, with sales of 100 tons at $53 currency. Scrap is without change; there is none offering on the dock from first hands, and we hear of no sales excepting small lots at $45a46 from dock, and $50 from yard. The market for Refined Bar continues steady at our quoted figures, though we notice a decline of 3-10 of a cent in Philadelphia. The Bar Iron makers were in session yesterday at the St. Nicholas, but their doings did not transpire. Fifty packs No. 1 Stained Russia Sheet sold on private terms.

PHILADELPHIA, Oct. 14.—(From Circular of Edward Samuel.)—There has been more inquiry for Pig, but with the exception of a sale of 700 tons Scotch, on private terms, there have been no transactions of magnitude. The Philadelphia Mills have reduced the base price of Merchant Bar to 5 cents per lb. Boiler and Ship Plate are in active demand, with no reduction. Closing prices:—American No. 1 Foundry Pig, at Furnace, $52,50a54; No. 2, $50a51; No. 3 Forge, $45a46; No. 4 White and Mottled, $40a41; American Refined Bar (Mill price), 5 cents; Common $100a115; Rails (at mill), $87,50a90.

COPPER—New Sheathing is steady at 43 cents, and Bolts and Braziers 45; Bronze and Yellow Metal Sheathing 27, and Y. M. Bolts 32, cash. While the demand for Ingot is still limited, the market, aided by cables from England advising an advance there of £2, say Chili Bars £87 and Best Selected £92, has more tone than before; we note sales of 250,090 lbs. Lake at 31¼a32¼ cents cash, and 32½ for November delivery (now 32¼a32¼ cash); and 100 tons English, to arrive, part 29a29½, quoted on the spot 30a30½ cents.

LEAD—Since the considerable movement in Foreign Pig noted in our last, the market has been quiet. Holders, for the most part, remain firm at $6.55a6.62 gold for ordinary, though 50 tons are reported sold at $6.40. Block Tin Pipe, 60 usual discount &c.

STEEL—Is steady at old quotations, with some disposition to advance, prices never having risen in proportion to the advance in Iron.

SPELTER—Foreign is without movement, and prices are nominal at 6¼a6¾ cents gold. Best American is selling at 10½ cents currency.

TIN—The market for both Pig and Plates is still at a stand, and prices remain quite nominal. Straits and Malacca Pig is held at 33½ cents, English L. & F. 33¼, and Banca 38 gold. The business in Plates is wholly of a jobbing character. We retain previous quotations, but they are, in the present stagnation, nominal.

ZINC—The market for Sheet is steady at old prices—150 casks Mosselmann Sheet sold from Agents' hands, at 9¼ cents less 4 per cent. gold; and 15 casks do from dealers hands, 8¾ net gold. Manganese black oxide 4c. currency, gray peroxide 6 cents.

METALS.

NEW YORK, October 17, 1872.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¾ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton. All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ℔ ton	60 00@— —
Gartsherrie	56 00@57 00
Glengarnock	54 00@55 00
Eglinton	52 00@52 50
Pig, American, No. 1	53 00@55 00
Pig, American, No. 2	51 00@52 00
Pig, American, Forge	45 00@47 00
Bar Refined, English and American	115 00@120 00
Bar Swedes, assorted sizes (gold	120 00@130 00
	Store Prices, Cash.
Bar, Swedes, 1¾ to 5 x ⅜ & ⅞ 2 sq. & 6 to 12 x ⅜ & ¼	145 00@155 00
Bar, Refined, ¼ to 2 in. rd. & sq. 1 to 6 in. x ⅜ to 1 in.	— —@120 00
Bar, Refined, 1¼ to 6 by ¾	125 00@— —
Bar, Refined, 2½ to 2¾ round 1 & 1¾ by ¼ & 5:16	127 50@— —
Large Rounds	127 50@140 00
Scroll	140 00@170 00
Ovals and half-round	140 00@160 00
Band	— —@135 00
Horse Shoe	130 00@140 00
Rods, ⅝ to 2-16 inch	125 00@165 00
Hoop	145 00@190 00
Nailrod	@ 9
Sheet, Russia, as to assortment (gold)	17 @ 17½
Sheet, Singles, D. and T. Common	7½@— 8½
Sheet, D. and T. Charcoal	8½@— 9
Sheet, Galv'd, list 10 per cent discount	—@— —
Rails, English (gold), ℔ ton	73 00@ 74 00
Rails, American, at Works in Pennsylvania, currency	85 00@ 97 50

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 43
Copper Bolts	— @— 45
Copper Braziers, 16oz. and over	— @— 45
Copper Nails	— @— 45
Copper, Old Sheathing, &c. mixed lots	26 @— 28
Copper, Old, for chemical purposes, 14@16 oz.	— @— —
Copper English Pig	29½@— 30
Copper, American Ingot	32⅝ @— 32⅝
Yellow Metal, New Sheathing & Bronze	— @— 27
Yellow Metal Bolts	— @— 32
Yellow Metal Nails	27 @— 30

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2¾ cents ℔ lb.

Galena, ℔ 100 lbs	$— —	@— —
Spanish (gold)	6 50	@6 62½
German, do.	6 50	@6 62½
English do.	6 6¾	@7 00
Bar (net)	9 25	@— —
Pipe (net)	— —	@11 00
Sheet	— —	@11 00

Colwell, Shaw & Willard Tin-Lined Lead Pipe 16½ cts. ℔ lb.

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.

English Cast (2d and 1st quality) ℔ lb	— 16½@— 20
English Spring (2d and 1st quality)	— 9½@— 10½
English Blister (2d and 1st quality)	— 11½@— 16
English Machinery	— 11½@— 13¾
English German (2d an 1st quality)	— 11¼@— 12
American Blister "Black Diamond"	— — @— 11½
American, Cast, Tool do.	— — @— 17
American, Spring, do.	— — @— 11
American Machinery do.	— — @— 11½
American German, do.	— 9 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	38 @40
Straits	— @33½
English	33¼@33½

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$13 00 @— —	$14 75 @15 50
I.C. Coke	11 75 @12 00	12 50 @13 75
Coke Terne	10 50 @11 00	11 50 @— —
Charcoal Terne	11 50 @12 00	13 00 @13 25

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb.	6 62½@ 6 87½
Plates, Domestic p lb.	8¾@— 10½

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c. per lb

Sheet per lb.—	10 @ 10½

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, Oct. 17, 1872.

The following reports from the San Francisco Stock Board are dated the 10th and 15th inst. Excepting a decline of about $40 in Raymond & Ely, and a slight falling off in Gould & Curry the market is somewhat stronger. The reports evincing a steadier feeling in the Board than has been noticeable for a long time past.

		Oct. 10.	Oct. 15.
Savage	—	91	95
Crown Point	—	102	118
Yellow Jacket	—	85	86
Kentuck	—	222	—
Uncle Potosi	—	51	54½
Gould & Curry	—	167	165
Belcher "New Issue"	—	90	90
Imperial	—	9	8¾
Hale & Norcross	—	—	—
Eureka G. V.	—	—	—
Ophir	—	—	—
Alpha	—	—	—
Raymond & Ely	—	141	117
Meadow Valley	—	24¾	27

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The dues for the year ending May, 1873, are now payable. All members and Associates who have not paid their dues are requested to do so at once, by sending in postal orders, or checks, or money, ten dollars to the Secretary.

All members and Associates who pay their dues for each current year, strictly in advance, will have sent to their address, regularly and weekly, the ENGINEERING AND MINING JOURNAL, which is the organ of the Institute, and will contain the proceedings and transactions, and all important papers read before the Institute and all notices of meetings. Back numbers cannot, as a general rule, be sent.

II. It is expected that the more important papers read before the Institute, and the debates thereon, will be published in annual or occasional volumes to which those Members and Associates will be entitled who have paid their dues.

III. All authors of papers are requested to notify the Secretary in advance of the meetings, giving the subject and length of their papers. Attention is also called, in this connection, to Rules 12 and 13.

IV. The ninth rule has been amended, so that there will be hereafter three meetings a year, in February, May and October.

Wilkesbarre, Pa. MARTIN CORYELL, Secretary.

MISCELLANEOUS.

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Bethlehem, Penn.

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For further information address

B. W. FRAZIER,
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Oct.1.1.year

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Blast Furnace Construction.

NEXT to the vast increase in the size of furnaces we think it will be generally conceded that one of the most marked features in the progress of blast furnace construction during the past twenty years or so has been the reduction effected in the mass of materials employed in building such furnaces. An examination of one of the older furnaces, with its truncated conical form, and its enormous thickness of walls, is apt to convey the idea that the chief point kept in view in designing it was to produce a structure having the least possible capacity with the greatest possible mass of materials; while in the large modern furnaces, such as those erected in the Cleveland district, for instance, we find thin stacks, protected, in some instances, by an outer casing of boiler plate, and often carried upon cast-iron columns instead of the massive pillars of brickwork or masonry formerly employed. While, however, this progress has been made in this country, it has been left to a continental engineer, Herr F. BÜTTGENBACH, the managing director of the Neusser Iron Works, at Neuss, in Rhenish Prussia, to carry out the principle of building thin stacks to its limit, and the success which has so far attended the adoption of his plans, together with the fact that they appear to be little known in this country, leads us to suppose that some information concerning them will interest many of our readers.

The leading features of Herr BÜTTGENBACH'S furnaces may be said to be that the base is entirely independent of the furnace proper, and that the stack has simply to act as the shell of a furnace, and is relieved of all loads such as top gallery, gas tubes, etc. The base is formed of seven brickwork piers disposed in a circle and inclining slightly inwards, their tops being connected by arches and by a crown ring, which rests in a recess formed in the inner side of the ring of brickwork on the top of the piers. The shaft which rests on the crown ring is built of fireclay blocks, moulded to the proper form, and is of a thickness only equal to the length of these blocks, the thickness being thus about the same as that of the lining of one of our large modern furnaces.

The boshes of course meet the stack in the usual way, and at their widest part, where they form as it were the base of the stack, they are well supported by the crown ring of the piers. Both the stack and boshes are hooped at intervals, and the latter is, at its junction with the hearth, protected by water boxes. Water boxes are likewise applied to the hearth, and the tuyeres and tymp arch are protected by cast-iron boxes or blocks through which water is kept flowing.

The stack of the furnace being entirely free of all surrounding walls or casings, it is not strong enough to carry the top gallerys, etc., and Herr BÜTTGENBACH accordingly supports the top platform with its attachments by five hollow wrought-iron columns, which spring from the top of the base, and, being connected by branches to the shaft, serve to conduct the escaping gases down to an annular reservoir in which any foreign matters are deposited, and from which the gases are led off to the blast-heating stoves and boilers. It follows from this arrangement that the stack of the furnace is quite free to expand or contract, there being no rigid connection between it and the gas tubes or columns.

The gases pass off partly through a central tube—which descends into the throat of the furnace and is furnished with a bell mouth at its lowest end—and partly through five lateral openings, from which branch tubes lead to the wrought-iron columns or down-come tubes, already mentioned. The throat of the furnace around the central tube is left quite open, and it is provided with a short iron chimney having openings through which the barrows containing the charges can be tipped.

It is claimed by Herr BÜTTGENBACH, that where his system of construction is adopted the original form of the furnace is maintained, as the cooling, which goes on from the outside, is sufficient to prevent internal corrosion or fusion of the fire-clay lumps composing the shaft, and that from the thinness and complete exposure of the latter every facility is afforded for repairs, should they be needed. It has been urged with some plausibility, and amongst others by the well-known metallurgist, M. TUNNER, that the cooling which effected the preservation of the shaft would entail a wasteful expenditure of fuel. Herr BÜTTGENBACH, however, denies that the cooling is sufficient to produce such an effect, and the results which have been obtained by his furnace certainly give great force to his opinion.

As we have already said, Herr BÜTTGENBACH'S plans have been adopted with success in practice. The first furnace built on his system was erected at the Neusser Iron Works in 1865, and it has since been at work, producing 44 tons of iron per day, and it is still in complete working order, and is stated to have required no repairs whatever. A model of this furnace, we may mention, was exhibited at Paris in 1867, and this model, after having received the only prize in its class, was purchased for the museum of the Ecole Centrale at Paris.

Some of the experience which has been gained with the first furnace at the Neusser Iron Works is valuable, as showing the insignificance of the loss of heat by external radiation. At the same time that the new furnace was put up a new blowing engine was also erected for the supply of blast to both the furnaces, but this engine, when got to work, showed important defects, and in consequence of repairs which were needed it had to be stopped altogether 72 days at different periods during one year. The working of the new furnace had always to be suspended when these breakdowns—which happened without warning—of the engine took place; but it always took up its regular performance again when the engine resumed work. On the occasion of one of these break-downs the furnace was deprived of blast for a period of three weeks, with the external temperature varying from 3° to 4° Fahr., while, during the Franco-German war, in consequence of the impossibility of obtaining coals, the working of the furnace had also to be suspended on different occasions from two to three weeks, and at one time, even for ten weeks, with the external temperature 3° Fahr. In all these cases, however, the furnace is stated to have readily resumed its work, and to have again attained its normal production in two or three days. These facts go to support Herr BÜTTGENBACH'S views that the external cooling is not of so great an amount as to exercise a detrimental effect.

Besides the furnace at the Neusser Iron Works, a number of others have been erected from Herr BÜTTGENBACH'S designs, and the French ironmasters in particular have recognised the value of this plan. Thus two furnaces have been erected at the Usines d'Anzin, near Valenciennes; two at the works of MM. de la Rochette, Givors-Isère, near Lyons; two at M. Harel and Co.'s works, near Lyons; two at the St. Louis works, near Marseilles; one is in course of construction at the works of MM. Festuyères, near St. Dizier; and another at the works of MM. Desforges, of Wasy, Haute Marne. In Austria, also, three furnaces are at work at Inneberg, near Vienna, and one at Sigl's works, at Putten; while two others are in use at the works of MM. d'Huarts.

The furnaces at Anzin are smelting oolithic ores; those at the St. Louis works, magnetic iron ore, used for producing Bessemer pig; while those at Messrs. Harel and Co.'s are smelting Spanish ores, so that the system has been tested by a considerable range of practice. At the Neusser Iron Works, Herr BÜTTGENBACH'S furnace is smelting a mixture of brown and red hematites from Nassau, and brown iron ores from North Brabant, Limbourg, and the neighborhood of Crefeld; these minerals being supplied in small pieces, and generally in a very moist state. On the average the mixture contains 27 per cent. of iron, and the proportions of the ores are generally such that the oxygen of the acids is equal to the oxygen of the bases. The product is grey foundry pig, No. 1, with a white pulverulent cinder. The charges consist of about 900 kilogrammes, or about 18 cwt., and the consumption of fuel is stated to be from 25 to 27 cwt. of coke per ton of pig produced. The furnace has six tuyeres each 3 in. in diameter, and it is blown at a pressure of 4.8 lb. per square inch by a beam engine with a single blowing cylinder 98¼ in. in diameter and 7 ft. 5 in. stroke, and running at nine revolutions per minute. Under these circumstances the production is 49 tons per day.

Altogether there is, as we have said, much in Herr BÜTTGENBACH'S plans to render them worthy of the careful attention of our ironmasters, and we hope to hear of their trial in this country.

—*Engineering.*

Working in Compressed Air.

M. P. BERT has presented to the French Academy of Sciences a communication in which he describes his experimental researches on the influence that the changes in the pressure of the atmosphere exercise on the phenomena of life. These investigations have a great practical value. It is known that a sudden increase of pressure may be attended with fatal consequences. Workmen exposed under pressure in mines, in sinking foundations, are exposed at the moment of release to casualties often of a serious nature, such as acute local pains, temporary paralysis, and even death. These phenomena have received from physicians and from engineers who have studied them very varied explanations. In the opinion of M. RAMEAUX, the learned physical professor to the Faculty of Medicine at Strasburg, the accidents should be due to the fact that the normal gases of blood (carbonic acid, oxygen and nitrogen) dissolving themselves to a high degree under the influence of extreme pressure, return into a gaseous state as soon as the pressure is reduced to one atmosphere, obstructing the veins, and exposing the patient to the same dangers that would be produced by an injection of air into the veins.

This hypothesis of M. RAMEAUX has been entirely confirmed by the experiments of M. BERT. These experiments have been made with dogs, cats and rabbits. Applying the data thus furnished to the conditions existing in working under pressure, M. BERT arrives at this conclusion: that up to three atmospheres abrupt reduction of pressure does not present serious dangers, but that these dangers increase very rapidly from five atmospheres. While divers, working in a depth of 40 metres, can be brought constantly to the surface without accident, the rapidity with which they are brought up, would expose them to almost certain death, if they had reached a depth of 70 or 80 metres. Such a depth is unattainable, at least without employing the precautions indicated by M. BERT.

Profits of Mining.

AN English paper says that the month of August has added another 57,858*l.* 16s. to the profits distributed as dividends amongst the holders of shares in mines worked by British companies during the present year. These dividends for the eight months have exceeded 604,000*l.*, being more than twice the amount divided in the corresponding period of 1871. This is the more gratifying because it is well known that nearly every company has been expending an unusually large amount in the extension of its working plant, mine managers very wisely taking into consideration that by employing a proportion of the present surplus profits for this purpose they do all that is possible to secure a continuance of the present rate of profit, even should a temporary decline in prices, not now anticipated, take place. The dividends paid by companies working American mines have much swelled the list, although but few of them are yet in full working order; hereafter their effect will be still more felt.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
JOHN A. CHURCH, E. M.
Editors.

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THE meeting of the Institute of Mining Engineers at Pittsburgh, opened very successfully on Wednesday and continued under equally good auspices during Thursday, the adjournment taking place late on the evening of that day. Friday was spent in excursions, winding up with a supper in the evening.

Underground railroads are subject to some peculiar dangers. During a heavy rain one of the stations of the London Metropolitan road took in so much water that the fires of an approaching engine were put out. The switches would not work, the telegraph gave out, an Express train was coming and there was really serious danger. A new engine was fastened by means of a chain to the train but failed to pull it out. During this time the passengers were unable to leave the cars on account of the depth and fury of the torrent. A panic seized the railway officials, and despair the passengers, many women fainting. By great effort a few passengers were removed when up came the express, hailed by a shout of apprehension by all who looked on the scene. But fortunately the water had gone far enough down the tunnel, the coming train raised a wave before it and the fires of that engine were put out too. It approached to within about five feet of the cars before it.

WE regret to learn that Professor JOHN W. FRAZER who occupied the chair of Natural History and Chemistry in the University of Pennsylvania died suddenly on the afternoon of October 12, while entering his room in the new building. He was well known as one of the prominent scientific men of this country, and in a long life has contributed very greatly to the advance of science here. The years of his life were the years of our national growth from a raw and confined people, to one whose achievements and culture have already progressed very far and are now increasing at a marvellous rate. When he began his work science in America was individual, now it is the pursuit of large classes of our people. There is not one science whose present condition he could have even dimly prefigured when he began life, and in this marvellous advance he has had his part, and done his work. His life ended where it is peculiarly fitting a man's life should end, amid tokens of the industry with which it had been filled. The new building of the University will always bear the character of a memorial of one of the best and ablest supporters of scientific instruction in the United States.

THE Cambria Iron Works at Johnston, Pa., has had a great disaster and a great salvation. A fire broke out on Saturday night, October 12, in the rolling mill buildings which were nearly destroyed. The light machinery was ruined but the heavy machinery is reported to be but little damaged. Fortunately the Bessemer plant was untouched and one of the best specimens of American practice was thus preserved. Immediately after the fire the workmen met and volunteered to contribute a part of their labor in rebuilding the works. The construction of sheds was at once commenced, and has already progressed so far that the daily papers have announced the resumption of business. This rapidity has been made possible by the heartiness with which all persons and corporations, in any way connected with the works, lent their aid. We are glad to see an establishment so important, recover itself with so much elasticity. The loss was immediately after the fire put down at $400,000, insurance $100,000, but we have seen no confirmation of the report.

Week before last seems to have been the miners' week of trouble, from the number of fires reported. One at Black Hawk, Colorado, Saturday night, destroyed all the buildings of the Sensenderfer, Field, Black Hawk, Sterling, and Bobtail lodes, together with their machinery, mining tools, and some timbering in the shafts. Loss estimated at $30,000.

The iron foundry of Robinson & Co., at Philadelphia, was also burned the same day that saw the Johnston disaster.

Peat Fuel.

An innocent article in this paper on the subject of peat, in which we spoke of its cause as a bad one, has drawn upon us the kind attentions of the press and of our correspondent, whose letter we publish elsewhere. Under these circumstances it may be well to explain why we do not join in the loud cries raised every now and again in the peat interest. Our reasons are that the composition of peat is not that of a good fuel, and that the history of peat manufacture has not been a flattering one.

Peat when dried in the air contains about 25 per cent. of hygroscopic water and 28 per cent. more chemically combined water, and this fact reduces it at once to the level which lignite occupies among coals. It is a fuel that can be used, but that no one would think of using when he could get a better. To fit it for use it must be pressed and dried or charred. By one of the best methods 100 parts of peat in the bog make only 14 or 15 parts when worked up, compressed and dried. When the dry process is used the yield is somewhat more, but whatever method we employ we are forced to handle a great quantity of substance in order to make a small amount of product. This fact indicates that to be lucrative the operation should result in a valuble product. But when prepared the peat is worth only 40 per cent. as much as coal, for evaporative uses.

If we turn to metallurgical work we find that in its natural state peat has little value to the smelter. A proper consistency must first be given it in order to fit it for handling. It must then be dried at a high temperature or charred. Many modes of drying have been tried but in all the peat has been found a troublesome customer, and we believe all the attempts to torrefy it have been given up. When highly compressed and charred, peat makes a fuel as good as charcoal, but no means of making peat charcoal has yet been found which is sufficiently cheap to stand the competition of other fuels. Nor does this defect arise from any fault in the apparatus employed. It is inherent to the material. If a hundred tons of peat in the bog make 15 tons of compressed peat, and this again only four tons of peat charcoal, we think it is tolerably plain that there are the greatest difficulties in the way of the manufacturer, difficulties which are not the fault of the machinery hitherto employed, but of a kind which ingenuity can have small hope of overcoming.

In discussing this subject the advocates of the fuel are led into the absurdest style of argument. Our correspondent, Mr. SCUDDER, talks about peat being one of God's blessings, which is true, and says that the cause of peat is the cause of the people, which is a question. So far peat has not been produced in this country at a price which brought it within a poor man's means. It has closely approached coal in price and fallen far behind it in value. In our late article we said that after years of experimenting, peat stands just where it did in the beginning. Let us see what that position is. It is used in Europe in respectable quantities, both in Ireland where it is very cheap, and in Germany where it is rather dear. At least one railroad in Austria uses it a good deal, and we presume its use is more or less general on many German roads. But its use entails great inconvenience, and is also connected with a deficiency of good fuel, or at least what an American considers good fuel.

Few persons in this country understand the conditions under which Europeans have so long turned their attention hopefully to peat. Coal, indeed all fuels, are there extremely dear when compared to wages, and many people are forced to put up with what costs them little at the moment, without regard to its real economy. Peat, as a substance requiring a good deal of handling, but very common in its occurrence, and to be cheaply purchased on the ground, ought to meet with success in Europe, where wages are low, and other fuels high; but the history of this fuel there is not one which can encourage Americans to undertake its manufacture, except in very special cases. And yet we cannot expect to reach even the degree of success which the Europeans have attained. For here wages are high and the competing fuels comparatively low.

The only circumstances which can justify the manufacture of peat in this country are those which surround a mine situated in a region destitute of fuel. The experiment now making at Ishpenning, on Lake Superior, satisfies these conditions to some extent. It is made under as good auspices as the peat enthusiast can hope to find east of the Rocky Mountains. With this going on before us it is useless to talk and write. Let us wait for the lesson of facts, and see whether the Ishpenning furnace is a success, and whether its example is followed.

Mr. SCUDDER's letter, however, deserves further at-

tention for two reasons, He brings the ridiculous charge that we have written in some interest adverse to peat. The absurdity of this is sufficiently proved by his acknowledgment that our assertion in regard to the failure of peat after trials lasting through (say) 100 years, is true. The constant failure of all efforts to utilize this fuel is a sufficient reason why an editor should raise his voice against it. Another point in which he errs, with all other advocates of peat, is in saying that it is "the peer of coal in every sense of the word." Analysis and innumerable trials alike disprove that assertion, and in making it after so many and such positive denials of the fact Mr. SCUDDER lays himself open to the most serious imputations.

Our Critics.

Some of the American papers are crying *Tu quoque* to the English in consequence of certain unfortunate revelations in regard to the management of the London Metropolitan (underground) Railway. It appears that the financial history of this undertaking is one of almost unbounded deception and fraud. Dividends have been declared by means of loans raised to provide the funds reported as "net earnings." Certain servants of the Company have reaped profits of the most extraordinary kind, considering the work they had to do, and when these revelations forced the stockholders to assume the direction of affairs, their first act was to declare a new dividend, though there was confessedly no money to pay it with. If there are degrees in fraud it can hardly be denied that the open continuance of a discovered fraud is worse than the same deception when secretly practised. Stockholders avowedly meet to devise means for reforming a bad management, and to exhibit obstinacy in pursuing the very courses which they condemn so strongly, is certainly adding folly to dishonesty.

But our object now is not to present the stockholders of the Metropolitan Railway for judgment. It is quite the fashion for people who know of serious defects in their own circumstances to suppose that others manage their concerns better, because they preserve a fairer exterior. American railway management has been the butt of English journals for years, and the Erie and Tammany rings have been gravely pointed to as perfectly characteristic of society in the Republic, and as developments which were only natural in a country of adventurers. According to these critics the "rowdy element" received a severe blow in the fall of those great organizations, but is by no means destroyed yet, and still makes itself a power in our morals. We have nothing to say against attacks made upon individual manifestations of fraud, whether they occur in our own country or elsewhere. We welcome those which are directed against American swindles with pleasure, and see in the difficulties which honest business encounters on account of these developments, the strongest hope that means of purification will be energetically resorted to.

But those who throw back upon the English their charges of dishonesty in public affairs are not only right in fact, but right, to a certain extent, in principle, too. Criticism on foreign railway management comes with a bad grace from the English, whose mode of building railroads is the most systematically reprehensible of any known. It is not that English roads have notoriously fallen short of their projectors' promises, and are, as a rule, but poor investments. Men may miscalculate and be deceived. But when we look at the enormous sums spent in obtaining charters, at the way money is obtained and lavished, it is difficult to believe that all is honestly done. Railway building has been the subject of fierce competition in England, and from the very earliest day of the business the most objectional modes of financial management have been the rule. The early history of American railroading shows nothing to compare with the more than doubtful practices by means of which the first two, the first five, or the first twenty English roads were built. Americans have been comparatively slow to learn the opportunities for swindling offered by great railway corporations. Too hopeful calculations and positive dishonesty leading to severe losses have not been unknown to American projectors at any time, but it is only lately that railroading has been recognized by the sharper in this country as his grandest and most inviting field of operations.

If mismanagement indicates a low tone of morals in America, what does it indicate when practised by the solid British merchant? If the robbery of the widow and the clergyman is much more frequent in England than here, how is it that we are adventurers and the English high-minded? In their mining speculations, at least their American ones, our critics are notoriously incautious and corrupt, but from their disgraceful operations, the English individuals go forth purified while American mining receives slurs and sneers. So far as we have observed, a great part of our reputation for dishonest mining has been made in England by Englishmen and has nothing American in it whatever.

While Americans should deplore the evil practices that are only too common in all kinds of business here as elsewhere, they should never suffer the tirades of foreigners to persuade them that investment is more dangerous in their own country than in others. History shows that neither science nor experience can prevent robbery. We believe it was gambling which VOLTAIRE said had its origin when the first rascal met the first fool, and that and all other vices will go on whenever sharper and dupe come in contact. We must look upon dishonesty in our midst with apprehension and repress it with vigor. But let us not pay too much attention to the sneers of other nations until they can show that knaves and fools form no part of their population.

The Pittsburgh Meetings.

WE can, this week, find space to say only, that the Pittsburgh meeting of the Institute of Mining Engineers opened on Wednesday evening, October 16, with a session of great interest. A noteworthy feature of the occasion was the large attendance of iron manufacturers, completely crowding the hall in the Western University where the sessions are held. The proceedings of Wednesday night comprised an address of welcome by Mr. JAMES E. PARKE, JR., of the Black Diamond Steel Works, the reply of the President, and a paper by Mr. EDMUND C. PECHIN, of the Dunbar Iron Works, on the Position, Prospects and Need of the American Pig Iron Manufacture. This was followed by a lively discussion, in which the iron men generally took part, and which, like most of the debates at our Institute meetings, was terminated, not by the exhaustion of the speakers, the audience, or the subject, but by the inexorable fiat of Time. We shall commence our full report next week.

The Pig Iron Association had a very well attended meeting, and heard from the Secretary, Mr. THOMAS DUNLAP, a carefully prepared report, in which he traced the increase of the production of pig metal in Great Britain from the year 1740, when the production was but 17,000 tons, to 1871, when it reached 6,000,000 tons, and also in the United States, where in sixty-one years we have increased the product from 53,000 in 1810 to nearly 2,000,000 tons in 1871. Returns were given of the product of iron and steel, as taken from the figures of the census of 1870, and of the production of Pennsylvania by counties for 1871, which was listened to with great interest. The report reviewed the condition of the trade, and the technology of iron manufacturers, and was adopted and ordered to be printed for distribution to members. After a discussion on the condition of the trade, the prospect in regard to prices and kindred subjects, Mr. RAYMOND, President of the Institute of Mining Engineers, by invitation, addressed the Association. Professor E. T. COX, State Geologist of Indiana, and Mr. J. BLODGET BRITTON of Philadelphia, were also present as invited guests.

On Wednesday evening a large number of the members attended the meeting of the Mining Institute, in compliance with an invitation which had been formally accepted. The officers chosen for the next year are as follows:

President—A. B. Stone Cleveland, Ohio.

Vice-Presidents—Eastern—Edward L. Cooper, New York; Wm. Firmstone, Pennsylvania; Henry McCormick, Pennsylvania. Western—General James Pierce, Pennsylvania; A. B. Cornell, Ohio; A. B. Meeker, Illinois,

Treasurer—Jos. C. Kent, New Jersey.

Managers and Executive Committee—A. B. Stone, Cleveland, Ohio; Edward L. Cooper, New York, N. Y.; Wm. Firmstone, Glenden, Pa.; Henry McCormick, Harrisburg, Pa.; General James Pierce, Sharpesville, Pa.; A. B. Cornell, Youngstown, Ohio; A. B. Meeker, Joliet, Ill.; James I. Bennett, Pittsburgh, Pa.; O. W. Potter, Chicago, Ill.; J. H. Maxon, St. Louis, Mo.; Samuel Thomas, Catasaqua, Pa.; Joseph C. Kent, Phillipsburg, N. J.; W. F. Bartlett, West Stockbridge, Mass.; J. H. Hall, St. Louis, Mo.

Secretary—Thomas Dunlap, Philadelphia, Pa.

The Association now numbers about 130 members and represents more than half the iron producers in the country.

Peat Fuel in Metallurgy.

TO THE EDITOR:

SIR:—Your somewhat harsh and wholesale condemnation of peat fuel, in the last issue of your journal, has been the cause of some comment among your friends, and, I assure you, the general impression is that you have not done the cause justice by condemning it, or rather denouncing it as "bad."

The cause of peat is the cause of the people, and more especially the poor, and for this reason your remarks appear to be made in the interests of those who would debar the poor from one of the greatest blessings in life, a cheap and wholesome fuel. It is true, as you infer, that failures have been made in attempts, heretofore, to manufacture peat fuel by mechanical means, but does not the same charge hold good against other products until repeated trials and experience have overcome incipient difficulties? When coal was first introduced, some of the present generation will remember the anathemas heaped upon it and hurled at the heads of its friends, and it was by slow and tedious steps that the present perfection of the means to use it was reached.

Not one-hundredth part of the capital employed to reduce gold and silver mining to a system has thus far been expended upon peat, and petroleum has its history too. God did not place such vast deposits of peat upon His foot-stool without a purpose, and when I assert that peat fuel, properly prepared, is the peer of coal in every sense of the word, I claim also that it is worth all that it has cost to get it where it is. The Grand Trunk Railroad Company, of Canada, have been using peat fuel for over three years on their road, leaving their forest trees standing. Where it has been used on railroads elsewhere, it has commanded the admiration of engineers and firemen, who are the practical parties best qualified to judge of the merits of a fuel.

Pig iron has been made with peat fuel for many years in Sweden and Germany as well as at Ishpenning, on Lake Superior, a sample of the latter of which will shortly be exhibited in this city, and which will be found as good as the best charcoal pig iron ever made, if not superior.

Fearing to encroach upon your valuable space, presuming that you are disposed to treat the friends of peat fairly, I will close with assurances of no disposition on my part to find fault with the champions of any rival interest, so that peat is not trampled upon rough-shod.

Yours, truly,

WM. SCUDDER.

NEW YORK, Oct 2, 1872.

Ohio Gas Wells.

By J. S. NEWBERRY, State Geologist.

(CONCLUDED.)

In the vicinity of Cleveland, as in many other localities in the eastern half of the State, gas and oil springs are frequently met with, and many wells have been bored for one or the other of these useful articles. Here, as elsewhere, there are two marked lines of gas and oil springs, connected with the outcrops of the two sheets of bituminous shale which underlie the surface: First, the Cleveland shale of Lower Carboniferous age, which crops out along the base of the hills that bound the Cuyahoga Valley. This bituminous shale is from thirty to sixty feet in thickness and is the source of the oil of the East Cleveland and Kingsbury quarries, the noted gas spring at the brick yard beyond East Cleveland, etc. The oil of Mecca and Liverpool is derived from the Cleveland shale. Second, the Huron or Great Black Shale, which passes beneath Cleveland, and rising westward comes to the surface in Huron and Erie Counties and forms a broad belt of outcrop, thence to the Ohio river. The Huron shale has a thickness of 300 to 400 feet, mostly black and highly bituminous, and is the source from which the gas of the Neff wells and the wells on the lake shore, and the oil of Oil Creek are derived. In the valley of the Cuyahoga, in both Cuyahoga and Summit Counties, a large number of wells were bored for oil some years since. Most of these yielded both gas and oil, but neither in large quantity. From a similar well in the valley of Rocky river a copious flow of gas has continued to escape for several years. Of the wells recently bored in this vicinity, a brief notice may perhaps be of interest to the people of Cleveland. First, well at mouth of Kingsbury's run, bored by the Standard Oil Company for water. The depth of this well is 1,005 feet. The well head is about 10 feet above the river. Before reaching the rock 238 feet of clay with partings of sand and gravel were passed through. The rock penetrated was gray and black shale. Some water and gas flow from this well, but neither in large quantity.

Second, well bored by the Gas Company at the Gas Works near the mouth of the river; well head about 15 feet above the lake. This well is 835 feet deep. The rock was reached at 116 feet, the over-lying material being mainly blue clay, with sheets of quick-sand and gravel. The rock passed through consisted of alternations of gray and black shale. Gas was obtained at several points, but not in remunerative quantity.

Third, well bored by Captain SPAULDING between Cleveland and Rocky river. This well began about 100 feet above the lake. At the time of my visit it had been sunk to the depth of 715 feet. It passed through

1. Sand and clay, 12 feet.
2. Erie shale, gray argillaceous shale with bands of sandstone, 400 feet.
3. Black shale, with thinner bands of gray Huron shale, 303 feet. In this well gas was obtained at several horizons and the quantity is sufficient to light a number of houses.

From these facts it will be seen that the flow of gas from wells bored in Cuyahoga County has been on the whole, considerably less than from those further east, and scarcely sufficient to warrant any great confidence in the success of experiments of this kind.

Since the geological formation at Cleveland is precisely the same as at Plainesville, Conneaut and Erie, the difference noticeable in the quantity of gas obtained by boring in these localities has excited some surprise. The solution of the problem is, I think, this: As we approach the Alleghanies we find the strata which underlie Eastern Ohio and Western Pennsylvania more disturbed and broken. It is a well known fact that in the oil region many "dry wells" are bored, and these are failures because they pass through a compact mass of rock, penetrated by no fissures through which oil could flow. The successful wells are such as strike these fissures. Along certain lines or belts, fissures are more numerous than elsewhere, and in these belts are the productive wells. As we come westward, the sandy layers which form part of the series overlying the black shale in Western Pennsylvania, thin out and ultimately disappear altogether. These sandstone strata are the reservoirs and channels for the oil and gas. When they are wanting or unbroken, the oil and gas producing stratum is deeply buried and sealed up in a nearly impervious mass, so that little decomposition takes place in it, and the hydrocarbons which result from such decomposition escape only in small quantity and with difficulty. Hence in a region like ours, underlaid by a compact and unbroken mass of shales in which the sandrocks of the oil regions are wanting, failure must be the rule and success the exception. The use of torpedoes for opening fissures and loosening up compact strata, has given excellent results in the oil wells of Western Pennsylvania, and it is probable that they would be still more efficaceous in promoting the flow of gas from the solid and impervious strata which underlie Cleveland. The experiment is, at least, worth trying.

NATURE AND USES OF THE GAS OBTAINED FROM THE GAS WELLS.

The illuminating power of the gas of the West Bloomfield well and that from the wells of Fredonia and Erie has been measured, and found to be about one-half that of the gas used in most of our cities; or, technically, it is 7 or 8-candle gas, our city gas ranging from 14 to 18-candle power. It has usually the odor of petroleum, and contains a small quantity of condensible petroleum vapor. It is heavier than common street gas, and its heating power is greater. It contains carbonic acid and carbonic oxide, and when these are removed by passing it through a purifier its illuminating power is increased, and its heating power diminished. All who use it speak of it in terms of high praise as being extremely convenient for heating and lighting, and without objectionable qualities. When delivered from the well directly to the burners and not consumed, it accumulates so that the pressure sometimes bursts the pipes. A steam gauge applied to one of Mr. NEFF'S wells, in Knox County, ran rapidly up to 180 pounds, the highest pressure it would indicate. The pressure of the gas in the bottom of the well not tubed is certainly much greater than this, as it lifts a column of water not less than 500 feet in height. The gas of the well has no offensive odor, which is regarded as an excellence, but which may be a source of danger in its use. The offensive odor of street gas betrays its presence at once, reveals leaks and prevents accumulations and explosions, so that it may be regarded as almost indispensable to its safe use. The value of a well producing a copious flow of gas can hardly be overestimated. If the wells of Mr. NEFF had been so located that their enormous product could have been utilized, they would have yielded larger pecuniary returns to their owner than any oil well has ever done.

The comfort and elegance imparted to an establishment by an abundant flow of odorless gas are well shown in the residence of General CASEMENT. Here every fire in the house, in the kitchen range as well as the parlor grate, is fed by a fuel which gives a brilliant cheerful flame, is supplied and cut off by turning a stop cock, makes little smoke and leaves no ashes. And all this in addition to an abundant supply for illumination. So great a luxury as this is, makes doubly fortunate the man who possesses it, and is certainly worth some trouble and expense to those who would enjoy it.

In regard to the permanence of the flow of gas wells, it can only be said that it is controlled by the same influence with those that affect the permanence of oil wells. The gas well at Fredonia has been in action for forty years, in which time no sensible diminution has taken place in the amount of gas produced from it. The Neff wells have been throwing out their immense volume of gas, apparently without change, for six years. On the other hand many wells open gas chambers of limited extent, from which a flow issues, which, copious at first, is subsequently greatly reduced. Gas wells, too, like oil wells, when crowded draw from each other. Our experience teaches, however, that when not affected by other wells the normal flow of any gas well, determined by some months of trial, will be maintained for years.

MINING SUMMARY.

California.

GRASS VALLEY DISTRICT.

From the Grass Valley *Union* of October 2:

The mining situation of Grass Valley district has improved greatly since our last review. Miners and mine-owners are very hopeful of the future, the mines inspiring the hope by giving good pay. We have not a single failure to chronicle, but many successes have come under our observation. Prospecting has notably increased, and instead of only one regular dividend paying mine in the district, as has been the case all through the weary Summer months, Grass Valley will have several. The effect this prosperity has on business is already felt. There are no miners or business men going away at the present time to find new fields of enterprise. Gold mines are the best and surest paying mines in the world and the fact is being realized by capitalists everywhere.

THE IDAHO MINE

is still turning out gold at the regular rate of about $40,000 a month with only fifteen stamps. The ledge is still looking well. About the latter part of this month there will be thirty-five stamps in operation. Then the monthly yield of the mine will be over $90,000. More men will then be employed in the Idaho. The annual meeting occurs in December, the first Monday, we believe, and the Superintendent's report will be of great interest. The Idaho is very economically managed.

NORTH STAR MINE.

The annual meeting of the stockholders was held last Thursday, in San Francisco and resulted (according to the *Bulletin*) in the re-election of the old Board as follows: A. K. P. Harmon, Thomas Bell, William B. Bourn, J. W. Gashwiler and John A. Faull. Subsequently, Mr. Harmon was chosen President; D. A. Jennings, Secretary; and Stephen Moore, Superintendent. The company have worked 6,601 tons ore, yielding 8,735 assay ounces gold, valued at $153,349, or $17 55 per ounce; net value of sulphurets worked, $8,324; from tributors, $2,945; from ore crushings, $2,495; from premiums on bars, $296; from miscellaneous sources, $9,898—making total receipts of $177,307. Adding $1,243 for value of supplies on hand at commencement of year, gives a grand total of $178,550. The total disbursements for the year aggregate, $182,687, or $4,137 in excess of receipts, which is the amount of the present liabilities. At the commencement of the last fiscal year, the company owed $13,879. This indebtedness has not only been wiped out, but the sum of $8,644 has been expended in permanent improvements at the mine and mill, while dividends of $27,000 have been paid to stockholders. The other disbursements for mine and mill supplies, labor, taxes, insurance, etc., show an aggregate of $123,164. As there are 3,000 shares in the mine, of the par value of $100 each, stockholders have reaped 9 per cent. interest for the year on their investment. During the previous year, stockholders received $76,500 in dividends, against $6,000 in 1869-70, and $45,000 in 1868-69. The mine paid its first dividend, after incorporation, in June, 1868. Thus in four years it has paid $154,500, but in the meantime it has collected $60,000 from stockholders, leaving a net profit of $94,500 or $31 50 per share. This is less than 8 per cent. interest per annum on the capital stock. At the mine the shaft is down 1150 feet, with a good ledge in the bottom of the shaft.

INDEPENDENCE CONSOLIDATED MINING COMPANY.

This company, whose claims are located in French Ravine, near Deadman Flat, are prosecuting their tunnel with vigor; the present contract completing 210 feet, as we understand from the Superintendent, Mr. Joseph Snyder, will be terminated next week, when work will be continued without intermission day and night. Three shifts will be employed, eight hours each. The company, whose office is now transferred to San Francisco and embraces some heavy capitalists, entertain very sanguine hopes of success, believing this tunnel will intersect several valuable ledges, which opinion we indorse and most heartily wish them the success their energy merits.

DAISY HILL MINE

is looking as well as ever as the miners go down on the

ledge. The mine is now being worked in a systematic and economical manner. It is thought that the Daisy will pay its way in the matter of development, and that a very few months will show dividends. The last crushing was thirty-four loads which gave $41 25 per load, or the sum of$402 50.

HOME MINE

located on Deer Creek, just below Wood's Ravine, in Nevada Township, is soon to be worked. It is owned by an incorporated company which has its principal place of business in San Francisco. The company has plenty of capital to work a mine with, and the members of it are not afraid of gold mines. It will prove, we hope, a profitable venture.

SCHUYLKILL Q. M. CO.

This company's ledge is located on Howard Hill, and believed to be a continuation of the Daisy Hill Co,s ledge. A tunnel has been run 350 feet from Mary's Ravine. They are now putting in a winze, are down 20 feet, and have the ledge of the thickness of from 12 to 18 inches, the rock showing an encouraging prospect.

EMPIRE MINE

continues to send up exceedingly rich ore. The run for the last two weeks gave $25,906 30 with twenty stamps. The rich strike appears to be a permanent one and is not a pocket. It was rumored a few weeks ago that the Empire Company had determined to pull out their pumps and close down the mine. Circumstances at the mine gave the color of truth to the rumor, since no supply of Winter's wood had been secured. Now there are no such rumors afloat, and the wood supply is being hauled to the mill and hoisting works. There are many mines in the district which have had pumps pulled out a few days too soon.

EUREKA MINE.

There seems to be no change in the underground affairs of the Eureka mine. Work in the way of exploration is going on with all energy, and a determination to find the pay rock is evinced. A bar of gold was brought in yesterday which was worth, in round numbers, $11,000, the result of a two weeks' run of the mill. That bar will cross-cut and sink very extensively and will be expended, no doubt in such work.

GREEN MOUNTAIN MINE

located on Osborne Hill is having a crushing put through the Gold Hill mill. The owners expect a big return, as the plates at the mill show. The owners are Simms & Biggs. The rock will go to nearly one hundred dollars a ton and about fifty are crushed.

GRAVEL MINES

are doing something. The "Town Talk" continues to pay about $2,000 a month to the owners at an expense of about $1,200. There are only two owners in the mine and they have gravel which will last for years to come.

THE INDEPENDENT MINE

is next to and adjoining the Town Talk. Arrangements are being made to put up a mill through which the gravel will be run. The body of pay dirt in the Independent mine is very large and is rich.

THE SAN DIEGO MINES.

From the *Daily Union* of September 24:

From Mr. L. L. Howland, who arrived from the mine on Sunday evening last, we learn that everything is going on very lively at Julian, Banner and Stonewall. All of the mills but the Antelope are running, and that will start up in a very short time on rock from the lead of the ame name.

The mill of DeFrees & Co. is now crushing rock taken from the 275 foot level. Men are constantly taking out the quartz, which is at once hauled to the mill and crushed. It is expected that the next clean up will show a better result than any previous one from the Owens mine. Our readers will remember that ore in considerable quantity was taken from this lead which yielded the sum of $74 per ton. If the expectation that is indulged in—that the next clean up will go still higher—is realized, then the owners of the lead will have one of the richest mines in the Julian District. They expect to make a clean up in about ten days or two weeks. We hope that everything will turn out as expected.

The mill formerly owned by Mr. Pierce has changed hands again, its old owner, Mr. Reynolds, taking possession. It is now running on rock from the Big Blue. About 40 tons from this lead are to be crushed. Judging by past "clean ups" the quartz is expected to yield about $50 per ton. The crushing will be completed by Thursday next.

The Redman mill is crushing ore from the Kentuck. The lot, though small,—25 tons—is very rich, and it is expected that it will yield fully $100 per ton. The stamps will be stopped this evening, and a clean up will be made with a better result, it is anticipated, than was ever obtained from Kentuck rock before.

The Ready Relief mill cleaned up a few days ago, after crushing ten tons of rock from their own mine. The clean up gave about $980. The mill is again at work on another lot of rock from the same mine.

The saw mill of Wilson & Co. has been kept constantly at work for several months past, without in any manner dismissing the demand for lumber. Although they can find any number of purchasers for lumber, they are getting their stamps in readiness to crush quartz, as they can undoubtedly make more by so doing. The different owners of rock are all anxious to get their work done, and good prices rule in consequence for custom work.

The most prominent topic at the mines just now is the probable change that is to take place at the Golden Chariot mine shortly. A representative of some San Francisco capitalists visited the mines a week or two since and made a bid. What amount was offered we are unable to say as the boys keep their own counsel in the matter. It is currently reported, however, that it is $100,000. Count Dwarakowsky accompanied the inspector to San Francisco, and will attend to the transfer. It is generally believed that the purchasers will make extensive improvements and develop the mine to its fullest extent. The gentleman who inspected the mine, it is stated, said that a thirty-stamp mill would be erected at once.

Work on the old mines is going forward vigorously. The Van Wert, Helvetia and others are turning out good rock and keep a full force of hands employed. The new leads, the Tom Scott, and Good Hope, No. 2, are both prospecting very well.

Considerable prospecting is going on, and one meets in a day's travel over mountains, a great many parties in search of the precious metal. All the stores are doing a lively business, selling prospector's outfits, as well as a good general trade.

From the *Mining and Scientific Press* of Oct. 5.

GRAVEL MINES.

Our auriferous gravel mines, both hydraulic and drift, appear to have prospered well thus far the present season. From the more northerly counties, in particular, very favorable accounts reach us; the mines along Slate Creek and its tributaries have done especially well. About La Porte, Howland's Flat, Hepsidam, and Whiskey Diggings, a better summer's work has been made than for many seasons past. The North America group of claims situate near the latter place having, it would appear, taken the lead. These are situated at the head of the basin, and have always been regarded as the principal feeders to the rich localities immediately below. They consist of several hundred acres, and were sold last winter to an English company, who, having since operated them with more system and vigor than ever before, will, as soon as practicable, proceed to open them up and work them on a very extended scale. This would have been done before now but for the delay in perfecting negotiations for the transfer of the property, which were prolonged quite into the winter, and a failure to provide working capital at the start for collecting and preserving the water and putting the grounds in condition to be worked to their full capacity.

Notwithstanding this failure and delay, these claims, under the capable and energetic conduct of Superintendent Morgan, have been brought into good shape and made to yield handsomely. A working force of seventy-five men is now employed, which is being increased as fast as suitable hands can be obtained, it having been found impossible to procure even indifferent miners there the past summer, though liberal wages have been offered. The new and present working tunnel—several others having been run—is now in a distance of 2,400 feet—a substantial tramway, with turn-out, having been laid along its entire length. This tunnel has been made of large dimensions, to give room for the employment of mules for hauling in and out the cars. At a point 1,900 feet in from its mouth a main gangway 350 feet long has been run off at nearly right angles on each side. From each of these a set of sub-gangways, 70 feet apart, have been advanced, running parallel with the main tunnel; the layer of auriferous gravel being cut up into long strips in this manner to insure more ready drainage and afford sufficient breast or surface for the drifters to attack it. Through all these gangways an iron track is laid down, over which the cars are run in from the main tunnel to receive their cargo. In working out these strips of gravel the drifters begin at the main gangway and advance to the upper end, a distance of from four to five hundred, feet taking off one-half of it as they go along; having reached the end they turn about and excavate the remainder, taking up the car track as they come along. Left without support, the superincumbent mass behind settles gradually down upon the rocks and debris left in the rear of the miners, it being very seldom that any caving or sudden subsidence takes place, A strip of gravel 30 feet wide is left standing next the main tunnel, for prominent support.

While these opened sections are in course of removal, other main gangways are thrown out four or five hundred feet in advance of the first, it being desirable that these be completed sometime before required for use, in order to drain off the ground, these old river channels making at some points a great deal of water. In the meantime the central adit is carried forward for the double purpose of securing advance exploration and partial drainage.

The ancient channel at this point appears to have reached an extraordinary expansion and to be, at the same time, extremely rich in gold. It has now been cross-cut by the gangways opened, for a distance of nearly a thousand feet without any signs of either edge, and it is possible this may not be one-half its entire breadth, such was the magnitude of these mighty Pliocene Rivers!

Not only the inner extremities of the lateral, but also of the sub-gangways and working tunnels are all in gravel of high grade, which it is believed will wash up from $2.50 to $3 per car load. For some months past Superintendent Morgan has been running out from eight to nine thousand car loads per month, with the prospect of making the number 10,000 the present month, and increasing it shortly to 15,000. An immense quantity of gravel has accumulated in the spacious dump yards of the company, there having been but little water for washing, since the most of it was taken out.

With the advent of the rainy season it is expected some, and possibly a considerable amount, of this gravel may be put through the sluices, though it is not likely the whole of it can be washed up before next spring.

Next season, the water, of which the company have a sufficiency on their premises, will probably be properly husbanded, insuring means for steady washing. Then also one or more of the tunnels already run, including, perhaps, a new one now in course of construction, will be made available for working purposes adding immensely to the aggregate production and accruing profits of the property. In reaching a condition so satisfactory, the North America grounds have not been exempt from the troubles and mishaps that have usually attended the development of this class of properties, a circumstance that should give encouragement to those still engaged in this somewhat hazardous but very hopeful branch of mining.

Idaho.

THE MAHOGANY MINE.

In the San Francisco *Call* of last Monday we find the following which we regret to say is well merited, and, in the main, a correct statement of the case:

Instances occur daily of the manner in which rings or cliques who control the mines manipulate the stock of their companies in their own interests, at the expense of the poor unsophisticated stockholders who are drawn into their nets. The Mahogany mine, which is situated away up in Idaho, has been the last piece of property used in this way; and as the plain statement of the facts will illustrate the operations which we have been endeavoring to point out to our readers for some time past, we will give them. On April 3d of this year, the Trustees levied an assessment of $1 50 on the stock, amounting to $15,000. A short time subsequent, the Trustees announced that the mine was turning out better than had been anticipated, and would be enabled to pay its own expenses. They accordingly generously rescinded the assessment, and the stockholders felt relieved. Upon this good showing, the stock advanced to $20a$25 per share. On August 5th, the stockholders' hearts were made glad by the announcement that a dividend of $1,50 per share would be disbursed, and things, to outsiders, began to look flattering. The price of shares was maintained for a few days, when the stock dropped rapidly. On the 25th of September, the Trustees announced to the happy shareholders that they wanted an assessment of two dollars per share to pay for the working of the mine; and the stock fell to $5 75 on yesterday morning[?] The whole operation of rescinding the first assessment, and paying the dividend was evidently a ruse to lure ignorant outsiders into investing in the mine, and it is asserted on the street that the last assessment was levied to pay for money borrowed to pay the August dividend. It is one of these games which we regret to see, particularly as it only affects outsiders. The regular speculators on the street are not affected by the "game," as all are thoroughly conversant with the tactics of the clique who control the management of this company, and few, if any, operators will touch any mine so controlled. *Owyhee Avalanche.*

Advertisements.

The special advantages of the ENGINEERING AND MINING JOURNAL, *as a medium for advertisers, are so great and so widely known that it may seem almost needless to call attention to them. It is extensively circulated among the engineers of the country and takes a position in this respect before any other publication of the kind. It has a large and constantly increasing circulation among miners and mine owners, and men connected with mining operations generally. As it is the only paper in the country that makes this subject a specialty it has this field entirely to itself, and is the only direct and reliable means of reaching this class of persons. Being kept on file by almost every subscriber, it is doubly valuable as a permanent means of keeping an advertisement before the public. It is the Organ of the* AMERICAN INSTITUTE OF MINING ENGINEERS, *and is regularly received and read* BY ALL THE MEMBERS AND ASSOCIATES *of that large and powerful society,* THE ONLY ONE OF THE KIND IN THIS COUNTRY. *It is therefore the best medium for advertising all kinds of machinery, tools and materials used by engineers or their employees. It is the recognized organ of the coal trade, and is taken extensively by the trade throughout the country, and presents the very best means of reaching that very important class of men.*

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The rates of advertising, compared with those of other weekly industrial publications, are very low, especially when the class of consumers among which its large circulation is almost entirely confined, is taken into consideration.

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Our central location enables us to draw from both sides of the Allegheny Mountains Metals and Ores best adapted for making a No. 1 Rail, and together with our Improved Machinery, are a sufficient guarantee of our ability to produce Rails of a quality unsurpassed for durability and strength, by any foreign or domestic manufacture.

New Patterns, of any desirable weight, made to order on Short Notice.

We respectfully solicit orders for New Rails, or Re-rolling. June 25.1y

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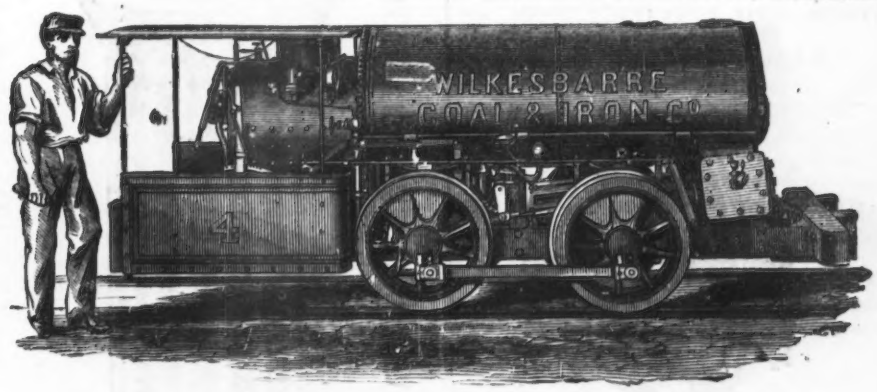

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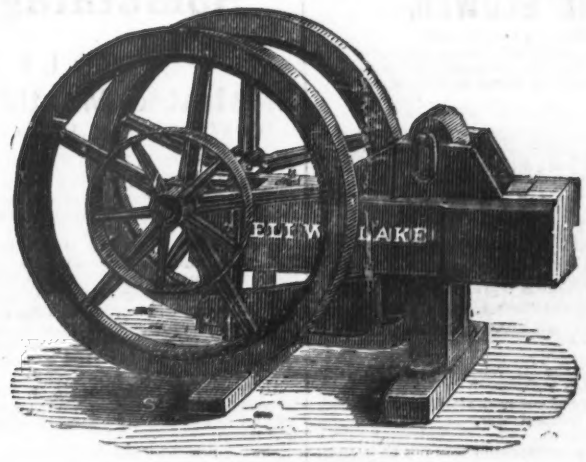

The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

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☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent facesor jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

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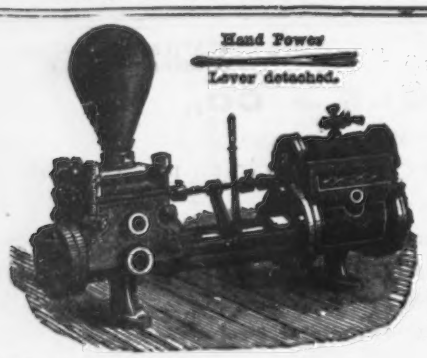

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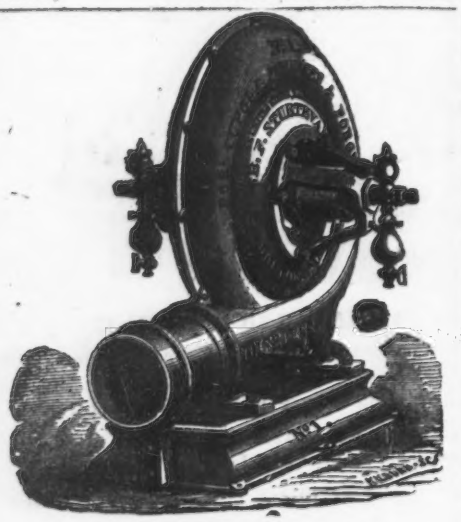

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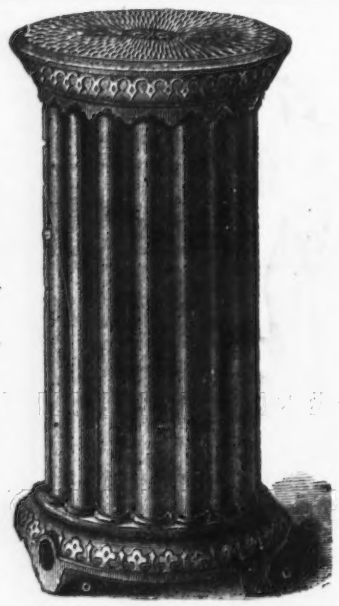

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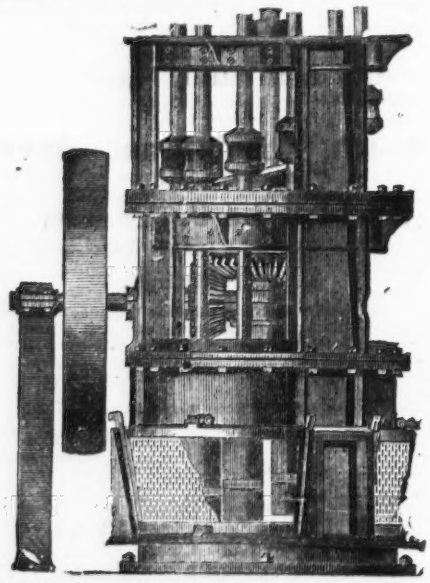

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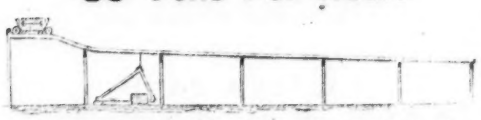

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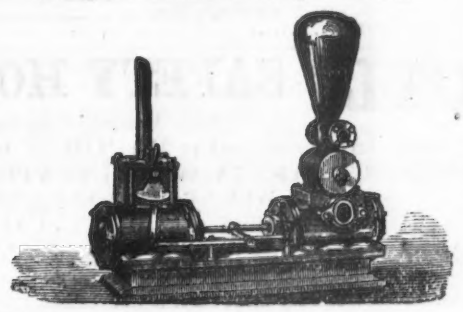

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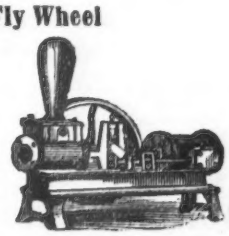

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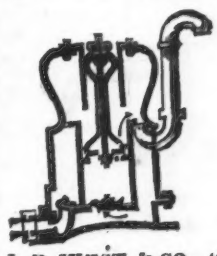

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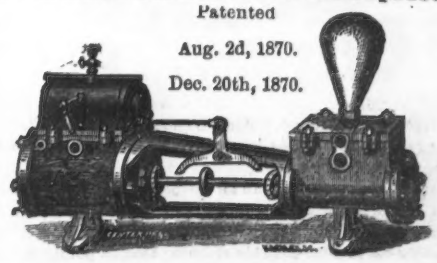

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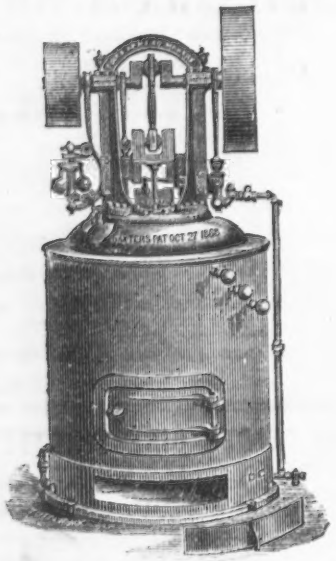

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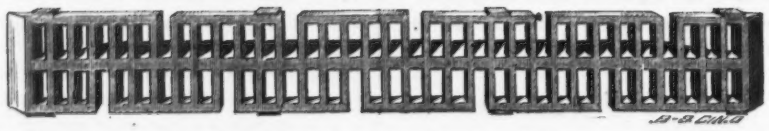

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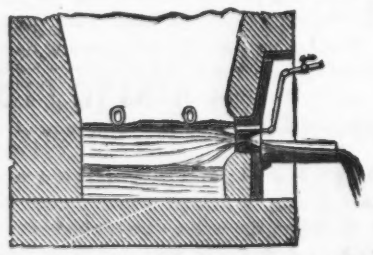

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